EXCAVATING ENGINEER

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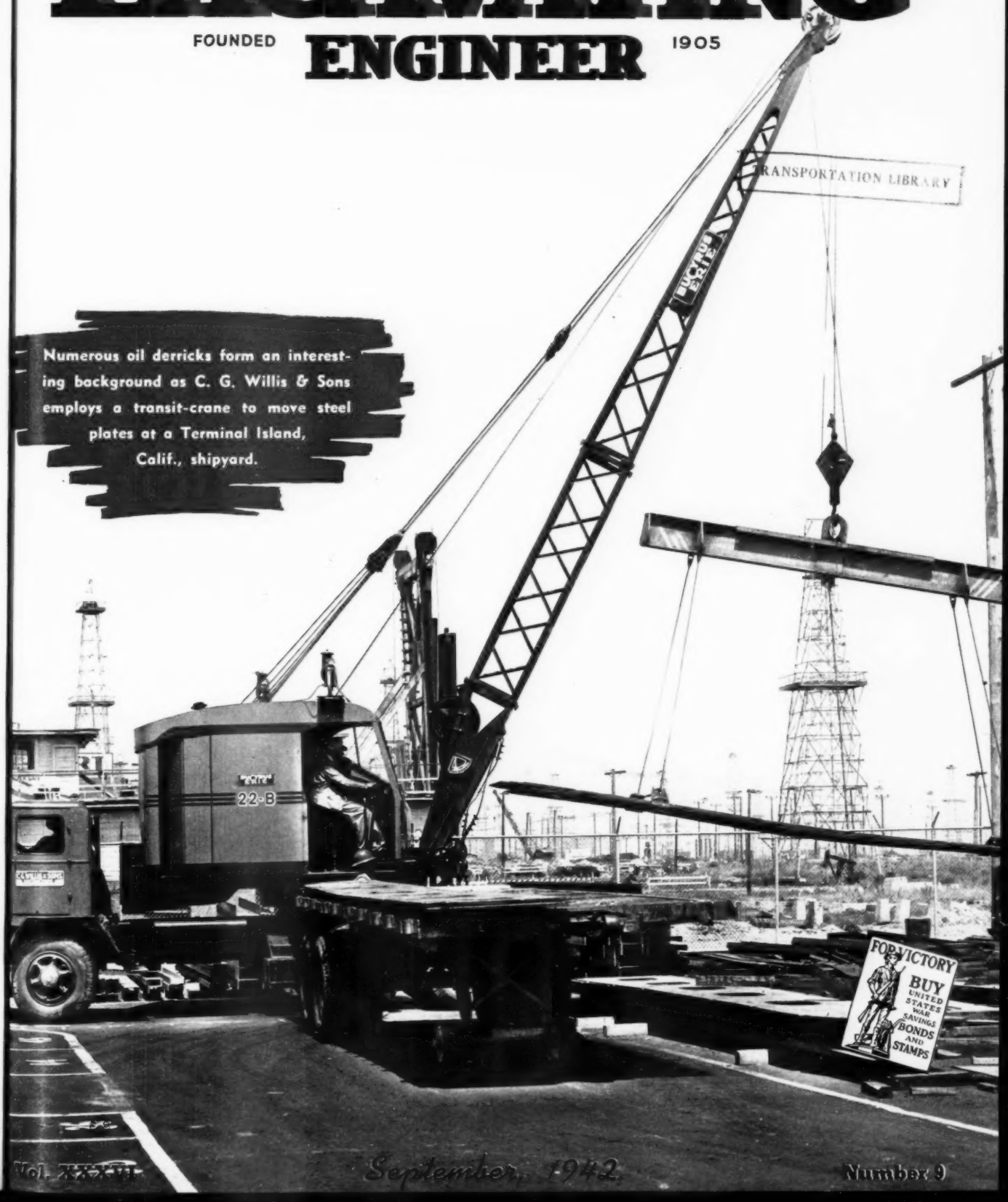


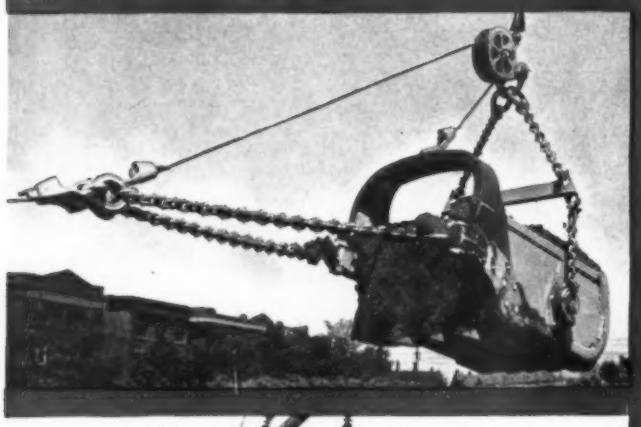
Numerous oil derricks form an interesting background as C. G. Willis & Sons employs a transit-crane to move steel plates at a Terminal Island, Calif., shipyard.

Vol. XXXVII September, 1942 Number 9

Here's why

RED ARCH BUCKETS

mean bigger output for you



YOU get big output with modern Bucyrus-Erie Red Arch buckets because they are streamlined for speed. Strong all-welded construction means minimum weight to lift and swing on every cycle, and that means more cycles per hour and more output per day. You get more dirt on every pass, too, with these outstanding buckets. Exclusive Beco Tiger Teeth bite into the digging in just the right way to get a heaping load in the shortest time. The pitch and shape of the Tiger Teeth, the location of the drag hitches with respect to the teeth, the location of the center of gravity of the bucket, the sharp cutting edge between teeth, all these are correctly balanced to give you high-speed digging. Proper weight distribution, placement of arch and hoist chains give a bucket that rides easily during fast swinging. The smooth curved interior of the bucket and the height of the arch give free quick dumping of even sticky material.

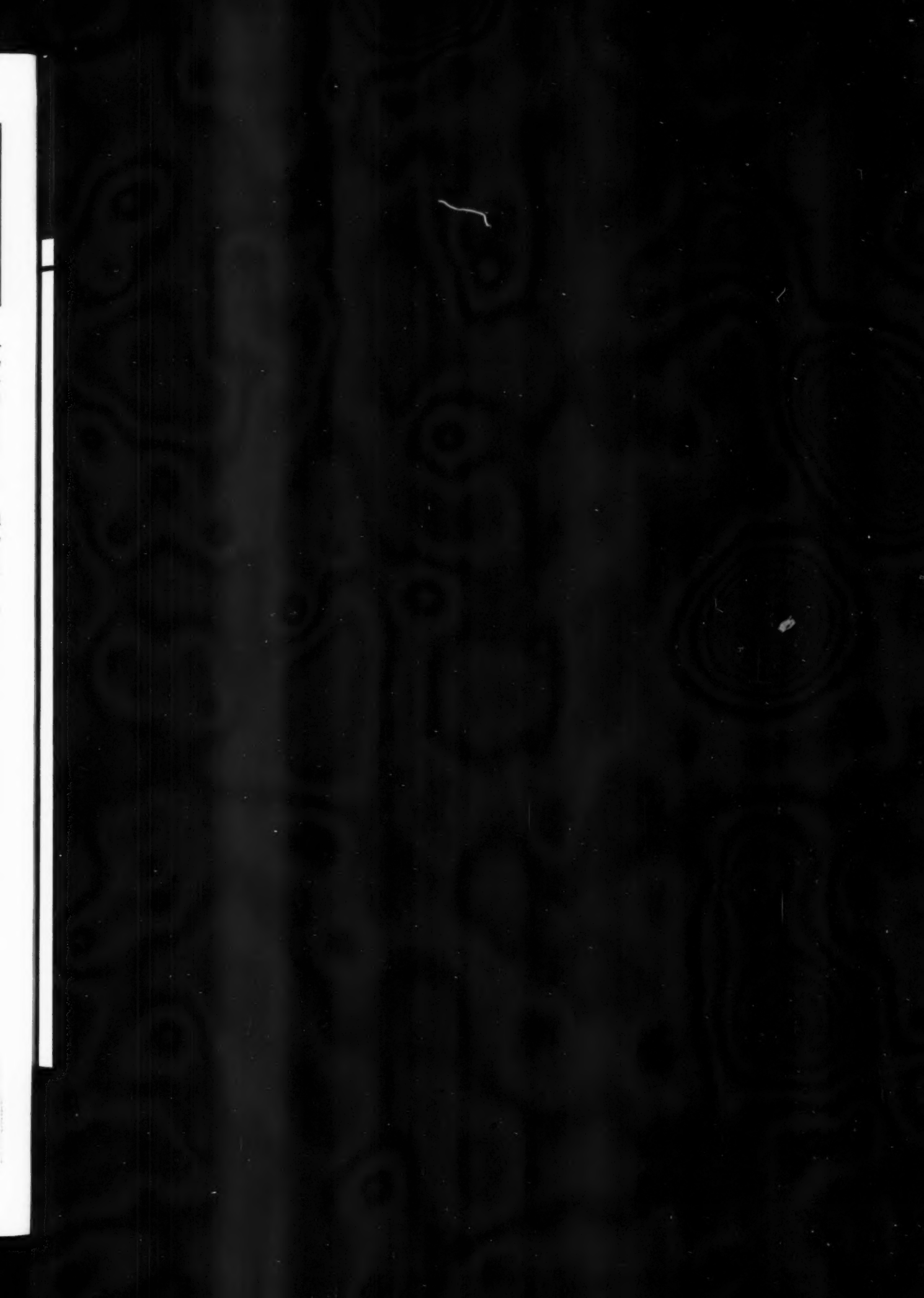
You don't waste time with Red Arch buckets. Operating time is spent actually moving dirt. Notice that the inserted forged-steel teeth have sufficient metal so they can be sharpened by reforging as well as by welding. These teeth are the easiest to remove and replace of any on the market. Their efficiency means real added output for you. These modern buckets are furnished with exclusive Red Arch incandescent butt-welded chain which gives up to 50 per cent longer life than ordinary chain.

Red Arch buckets are built in three types, for light, medium and heavy digging. Sizes range from ⅜ to 20 yards. Write today for full information on the size and type you need.

Bucyrus-Erie Co.

SOUTH MILWAUKEE, WISCONSIN

BUCYRUS ERIE



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FOUNDED 1905

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Published Monthly by THE EXCAVATING ENGINEER PUBLISHING COMPANY, South Milwaukee, Wisconsin, U.S.A.

F. O. WYSE, *Manager* — ARNOLD ANDREWS, *Assistant Manager*
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CCA Member Controlled Circulation Audit

Regular subscription: 25 cents per copy, $2.50 a year; Canada, subject to publication policy, $3.50 per year. Special subscription: Upon application on card inserted in this number this publication will be sent frequently (not regularly) free of charge, to companies, executives and supervisors engaged actively in the industry of excavation.

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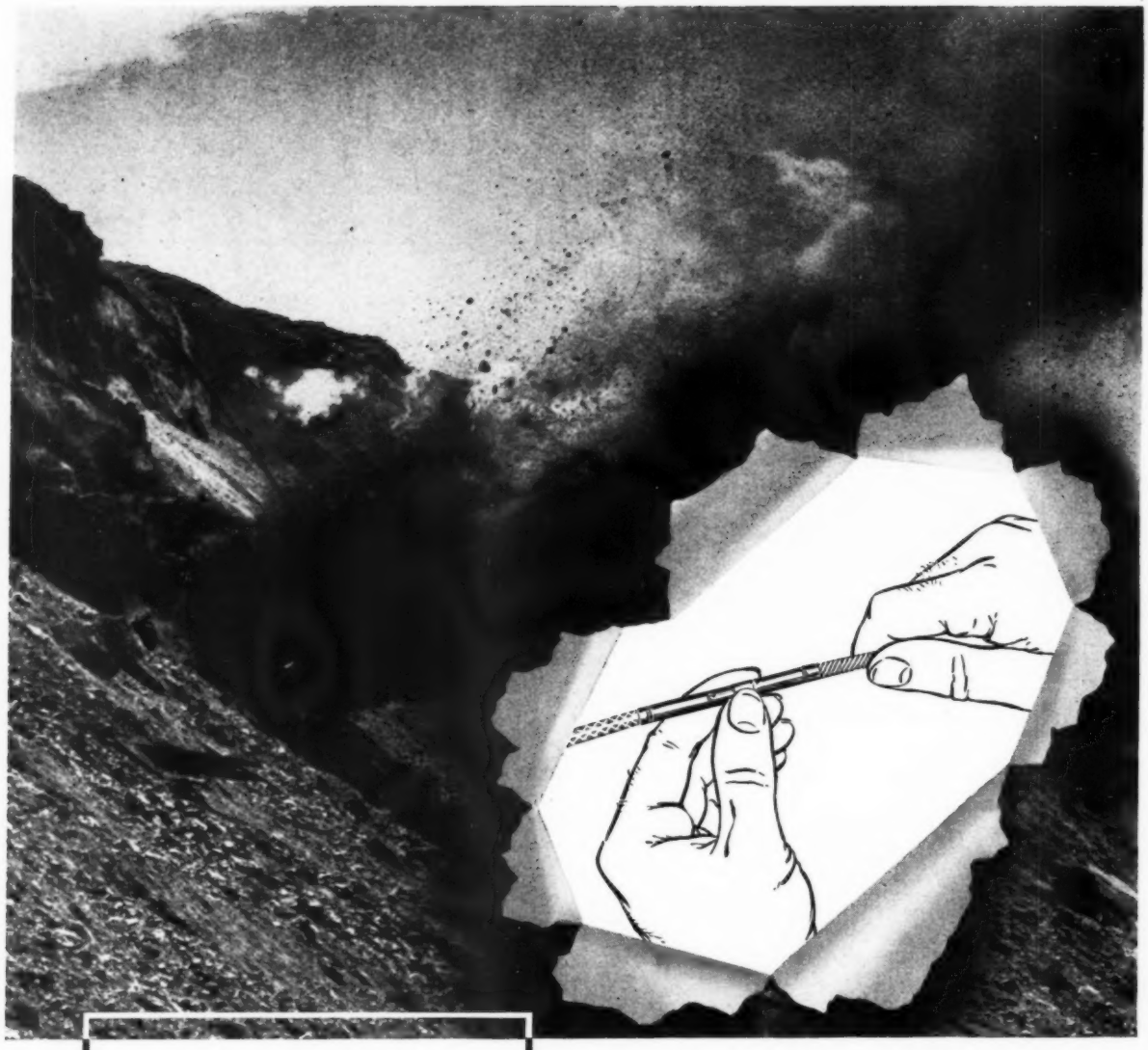

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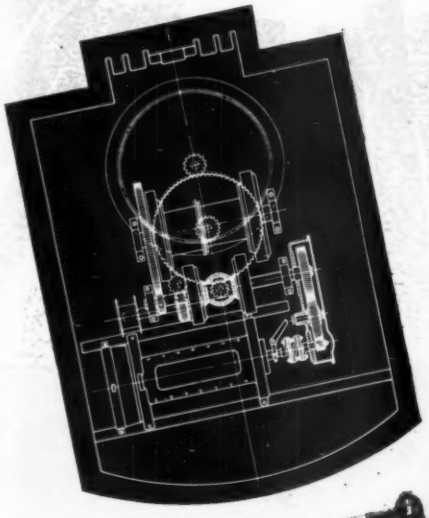
THAT HELPS GET THE JOB DONE!

TIME is short—and you don't want to spend it on upkeep! Northwest simplicity of design makes upkeep easy, speeds up and simplifies adjustment and plays a large part in getting things done.

Look at the Northwest deck! There are few shafts, few gears. All high speed shafts roll on ball or roller bearings. Cast machinery side frames assure the maintenance of shaft alignment and reduce the wear that results from weaving shafting and bearings. Simple, dependable, compact. When you plan future contracts, remember Northwest simplicity saves time and money.



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NORTHWEST

SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

IF YOU HAVE A REAL ROCK SHOVEL, YOU'LL NEVER HAVE TO WORRY ABOUT OUTPUT IN DIRT!

Producing Cement

SHORTLY AFTER the end of the Spanish-American war, a young American came down to Cuba. Comfortably fixed in life, widely travelled, cultured, his was a pleasant quest; he was looking for a little earthly paradise to rest from his travels, a temporary retreat where he could always find the warm Cuban sunshine, a green mountain sloping down to the sea, the music of a singing stream, and a certain amount of quiet loneliness, without being buried away from civilization, and, of course, the sea. The young American found his place, and found also a beautiful name for it, "Monte Verde," the Green Mountain.

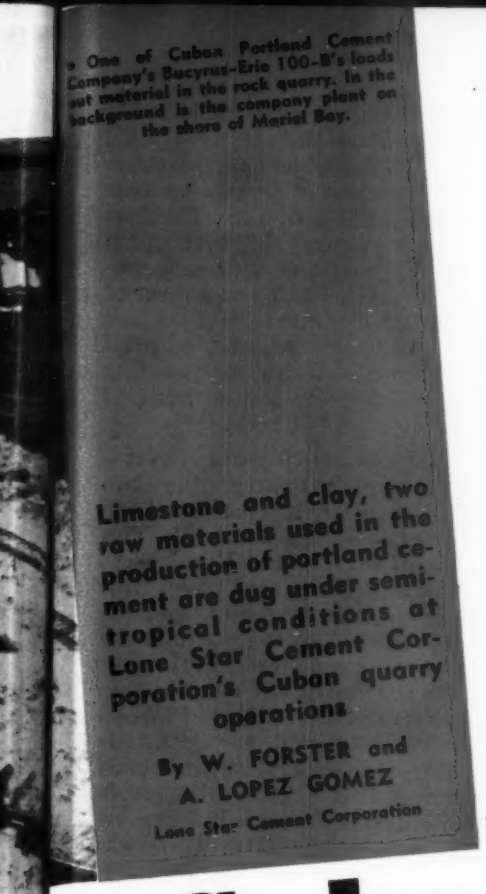
Some fifteen years later, other young Americans visited the green mountain by the sea but, giving the beauty of the scenery only a passing thought, came to the conclusion that the limestone buried under the green foliage and stately palms, deep and spacious, sheltered bay, and the nearness of Havana, would make the spot an ideal place to locate a cement plant.

That's how the cement plant of The Cuban Portland Cement Corporation, a subsidiary of the Lone Star Cement Corporation, came to be situated in the Bay of Mariel, some 21 miles west of Havana City, but within the boundaries of the Province of Pinar del Rio, the westernmost province of Cuba. Ground for the new plant was broken some time in 1916, and by April 1918, the plant commenced operations and has since produced many millions of barrels of "El Morro" cement.

Location of the plant close to the shore of the bay permits the shipping of the finished product without undue handling. Immediately behind the plant buildings, making the whole operation one integrated unit, the quarry pit ascends the coastal ridge, which is the beginning of the chain of mountains extending practically from Havana to the western tip of the island, parallel and close to the north coast of Cuba.

Excavating Limestone and Clay

Considering the location of the quarry in relation to the setting of the plant, it was obvious that open pit quarrying would be the most advantageous method of digging the material, and this method has been followed exclusively. Haulage of the raw material to the crushing buldings was never much of a problem, the limestone being quarried during early operations



One of Cuban Portland Cement Company's Bucyrus-Erie 100-B's loads out material in the rock quarry. In the background is the company plant on the shore of Mariel Bay.

Limestone and clay, two raw materials used in the production of portland cement are dug under semi-tropical conditions at Lone Star Cement Corporation's Cuban quarry operations

By W. FORSTER and A. LOPEZ GOMEZ

Lone Star Cement Corporation

n Cuba

almost on top of the crushers, and the clay, another important raw ingredient in the manufacture of cement, being excavated only a few hundred feet away from the crushers.

It may be well to say here that the coastal ridge where the quarry is located, with a maximum elevation of 270 feet is rather steep only on the sea side, sloping abruptly in places down to the bay shore, and stretching away in a narrow plateau at the top. The geology is typical of similar ridges in this part of Cuba, of recent formation (quarternary period) geologically speaking, and most likely caused by extrusion, following cataclysmic convulsions at land and sea. It is common in this type of formation to find the bulk of the ridge made up of broken up, intermixed layers of soft, sandy limestone, with pockets of hard rocks or boulders, covering an underlayer of clay, in most cases at sea level.

The problem in this quarry has been, from the very beginning, one of excavating the proper raw materials, in the right proportion, at the right time. Transportation has never presented any great difficulty, and only in times of extreme rainy weather has excavation proved much of a problem. The clay, however, has been at all times the elusive material, today to be found here, only to disappear tomorrow, and threatening always to become definitely non-existent.

It is generally estimated that some 600 pounds of raw materials are required to produce each barrel of cement, and since production at the Mariel plant has fluctuated from 200,000 barrels in one year to 2,000,000 barrels per year, production in the quarry has fluctuated accordingly, with a maximum of 500,000 tons annually, for both limestone and clay.

Railway Haul

Since the buildings housing the crushing equipment were erected part way up the slope of the hill, the original face or cut was started immediately adjacent, and reached only a moderate height in the early years. A railway track was laid parallel to the expanding face, and on this track the limestone and clay were hauled to their respective preparation plants, at first from two different levels; the limestone from the primitive cut, the original level of which has not varied much to this day, and the clay from a lower level at the bottom of the hill, only a little above sea level.

Starting with a yearly output of some 500,000 barrels of cement, or an annual requirement of about 150,000 tons of both materials, the excavating equipment used to obtain this production consisted of one Marion No. 76 steam shovel, railway mounted and equipped with a four-yard bucket. Another unit of the same type and capacity was soon added, and the two Marions were used exclusively for the excavation of limestone. For the digging of the clay, the excavating equipment consisted of a Thew electric shovel, railway mounted, and operating on standard gauge track, with 1½ yard bucket.

From the inception of operations, all exploratory drilling was carried out with a 4-inch Cyclone well drill, driven by a 20 hp electric motor. This same equipment was also used for many years for all important blasting work. After more than 20 years of continuous operation, this drill, still doing valuable service, is quite a landmark in the quarry, usually standing like a beacon on the highest part of the hill.

The early face of the limestone in the quarry, was neither high nor very long, but it was soon obvious that the great mass of rock rearing its palm-crowned top behind the plant site, would be quite a puzzle from an operating point of view. Although the deposit is largely limestone, it is so varying in chemical composition, hardness, texture and color, that excavating the different sections together constantly has been a tough proposition. And yet, at no time, not even when the yearly production for both rock and clay reached the top mark of 500,000 tons, was there any stoppage or delay in cement production caused through lack of either clay or limestone.

For many years, the normal method of operation in the rock quarry was to operate one or both Marion No. 76 shovels simultaneously in 10 hour shifts, according to requirements. Each shovel loaded the material excavated into Koppel sidedump cars, of eight cubic yard capacity, 10 cars to a train. These trains were hauled to the rock crushing building by one of three Vulcan locomotives, Type CS-14 x 20, 40 tons. At the crusher the cars were dumped with the aid of Sprague hoist, installed overhead, and electrically operated and controlled. In the clay pit, a small crew operated the Thew electric shovel in one or two, according to needs, eight hour shifts, the second one often being worked by floodlight. The material was loaded into two Western self-dumping cars, 16 cubic yard capacity, which were hauled one at a time by one of the three Vulcan locomotives to the clay crusher building.

Blasting has never been used very extensively in this quarry, especially in the early years, when

the cut was rather low, and the shovels could reach practically to the top of the face. However, as the shovels dug further and further into the hill, the height of the face increased gradually, and has reached in places the 100-foot mark. In the high sections of the hill, and particularly where the rock is of a greater consistency, no amount of undercutting will bring the top part down, without danger to personnel and equipment, and blasting is necessary. The explosive charges vary, but seldom are in excess of 300 to 400 pounds at one time.

The most important factor, perhaps, in the operation of this quarry is the question of climate. Many years of residence in Cuba brings one to the decided conclusion that there is nothing predictable about Cuban weather; what happens this year, or five years following, is no safe indication that the weather will follow a similar course in years to come. Still, it is generally admitted that weather in Cuba falls under two main denominations, the dry and the rainy season. But even admitting this division, neither season follows a definite pattern. There is a considerable range of "dryness" in the dry season, and of "wetness" in the rainy season. Average rainfall in this part of the island, taking into account the above qualifications amounts to some 50 to 70 inches per year.

Weather, because of its influence in all phases of quarry operation, especially in relation to blasting is an important production factor. Since the bulk of the limestone material belongs to the soft-textured type, large scale blasting, apart from objections owing to the proximity of plant buildings, docks, etc., would only cause a large proportion of the material dislodged to get wet during the next rainfall, never to dry again until it passed through the calcining kilns. And wet material, due mainly to difficulties in crushing, is to be avoided like poison in our quarry. In fact, a very wet rainy season, with the entire quarry transformed into a big puddle, is just a big headache all around.

Our clay quarry, like the music in the well known song has gone "round and round," always towards the southern end of the rock quarry. Digging has been carried out alternately at various elevations, from almost sea level to rock face elevation, with the exception, possibly, of the very top of the hill, where there is no clay to be found.

Clay Excavation Problems

The difficulties to be overcome, mainly during the rainy season, along the rock quarry, are aggravated and increased ten-fold in the clay quarry. The clay is found at the bottom of the cut, often under an overburden of very mixed rock reaching to a height of 100 feet. The only way to get rid of this mass of assorted materials, is to use them for cement production, a most undesirable solution from the chemist's point of view, but which, on the other hand, facilitates to some extent the excavation of clay. Furthermore, the bulk of this overburden of limestone is of very soft consistency, and resting on a layer of clay, it is clear that cave-ins and slides are too frequent, with all the uncovered clay disappearing each time under several hundred tons of unwanted rock.

After nearly 20 years of operation in our quarry, the two Marions, which had done good and honorable service during the digging of the Panama Canal, were feeling their age, and faced with heavy and costly repairs, the management decided to modernize the excavating equipment. In the year 1939 the first 100-B Bucyrus-Erie electric shovel of 3½-yard capacity was placed in service in our quarry for excavating limestone. During 1941 a second improved-type 100-B Bucyrus-Erie shovel of 4-yard capacity also was placed in service in the clay quarry, and both units are filling the requirements for the excavation of raw materials.

At the present rate of cement production, the yearly output of both limestone and clay in the quarry will amount to about 300,000 to 350,000 tons for 1942, or approximately 25,000 to 30,000 tons per month. This yearly yardage may not be very impressive, but the policy governing quarry operation is one of looking to the

• Equipped with a 4-yard dipper, this Bucyrus-Erie 100-B electric was purchased by Lone Star Cement in 1941 to assist in clay and limestone excavating operations.

• General view of the clay quarry with the plant in the background. The shovel is a Bucyrus - Erie 100-B of 3½ yard capacity that was purchased in 1939.

future, so as to insure steady production in both quarries, clay and limestone, and conserve these two essential raw materials for many years to come.

The entire quarry force, at the present time, consists of a foreman and 26 men, who work alternately in the rock and clay quarries, switching from one to the other, for a total of 44 hours per week. Only in cases of delays, due to breakdowns in the excavating and crushing equipment, or bad weather, are the two quarries operated simultaneously. This crew takes care of the entire operation and maintenance of all excavating and crushing equipment, including drilling and blasting, transportation, etc. Mechanical repairs and replacements to the equipment are usually done with the assistance of the repair and machine shop forces.

The actual excavation is done by either of the two 100-B Bucyrus-Erie Shovels, and the material is loaded into two trains of 10 cars, one of them being loaded while the other goes to the crusher plant. When the cut is relatively low, and the raw materials of soft consistency, the shovel scoops the rock or clay directly from the cut, but in places where the cut follows the slope of the hill, the top sections must be loosened or brought down by blasting. The normal explosive charge amounts to 100 to 200 pounds per blast, the holes varying from 30 to 40 feet in depth. This method brings down only enough material for a few days operation, and prevents a large mass of materials from getting wet while awaiting loading.

Improving Crusher Production

It is obvious from the foregoing that the excavating equipment at present in service is adequate for even a much larger rate of production. Either unit can load an entire train of 10 eight-yard cars with rock or clay in 15 minutes, or even less if necessary, but that same train load may take 30 minutes to pass through the crushers. Shortly after the placing in service of the first 100-B Bucyrus-Erie shovel, its very satisfactory performance brought more clearly into focus the real bottleneck of quarry operation, which was the crushing plant, the performance of which was affected to such an extent by prevailing weather and condition of the materials excavated.

A great step has been taken in the solution of these difficulties with the installation, in the early part of 1941, of a No. 7260 "Dixie" Non-Clog hammermill, fitted with a movable breaker plate. By now this machine has worked under the worst possible conditions, operating at times for a whole week on raw material which was nothing but a mass of plastic, sticky, water-sodden mud. The output during these periods of continuous rains has been reduced, but never to the extent of delays and continuous choke-ups experienced with the old crushing equipment.

Rain or shine, with new and modernized equipment, or with the old, veteran shovels, the quarry of the Cuban Portland Cement Corporation, overlooking the Bay of Mariel, in the Province of Pinar del Rio, has now operated for 25 years, and it has never been said that the plant had to shut down, or even curtail production because the flow of raw materials from the quarry failed and we are looking forward to many more years of satisfactory working in this hill overlooking the sea.

The "Green Mountain," which could have given cause to Columbus' famous words, when he first sighted the Cuban mainland: "This is the most beautiful land human eyes have ever seen," is still green for the most part, although at one end the quarry operations have cut into the palm-clad slopes. However, from this inert mass of limestone and clay, the progressive structure of modern Cuba has been slowly rising. The palatial buildings through the island cities, the streets and squares, the harbors and docks, and above all, the concrete highway that runs from one end of the island to the other, have been amassed and are held together with material that "Monte Verde" has contributed generously to the steady progress of Cuba.

A Vic

• Principal excavating tool on the Tomaro contracts which comprised the excavation of 3,000 feet of sewer trench was this Bucyrus-Erie 20-B equipped with a ½-yard Owen bucket.

A three-part story of how Cudahy, Wisconsin, accomplished a much needed improvement because its main street was also an important highway link

I. Cudahy's Highway 62 spells Victory in more ways than one.

FOR THE PAST decade tourists from the forty-eight states and D. C. and some from Canada have mildly cursed Packard Avenue, the main stem in Cudahy, Wisconsin. Habitual travellers between Milwaukee and points south, who found it necessary to use this road in their course of business, did not hesitate to vehemently proclaim their disgust over the extremely bad condition of this thoroughfare. Outsiders gleefully called it "Cudahy's Burma Road" or the "Glamorless Gorge."

Try as they might, the city government had no means to acquire funds to renovate Packard Avenue. Finally Vincent Totka, former alderman, was moved into the mayor's office by the electorate. He felt that one of his first obligations was to appoint a committee which could get results.

The group he appointed consisted of the heads of four large industrial concerns, a county supervisor, the city engineer, the city attorney and one alderman. Later, another industrial leader, a state senator, an assemblyman and another alderman were added. The Cudahy Chamber of Commerce, the Kiwanis Club and other civic organizations were inducted into some of the fifty sessions at which the machinery was put into motion.

Groundwork was laid very carefully. No details or legalities were overlooked. The long chain of meetings spelled success, for in 1941 Governor Heil pledged his support to the venture and the Wisconsin State Highway Commission awarded the necessary appropriation.

And it wasn't such a bad move at that. Cudahy is only three miles from the southern city limits of Milwaukee and consequently traffic to this city was extremely heavy because residents along the southeastern edge of Wisconsin used Packard Avenue as one of the inroads to Milwaukee.

Early in the summer of 1941, the local transport company began ripping out old street car tracks since Cudahyites wanted busses instead of trolleys on their new highway.

Sewer work was let and most of it finished in record time. Then, the bottom dropped. Orders came through to discontinue the work because the lease-lend program in America required many critical materials and Highway 62, the new born babe, was parked on the city hall doorsteps, awaiting the fate of the WPB's decision in Washington. In the meantime automobile and heavy traffic had been detoured to Kirkwood Avenue, a semi-macadam side-street which was in no condition to carry transport trucks and busses. Cudahy's street maintenance crew had to be on the job every day

cry Road Is Born

through a very slushy winter season. Repairs were continuous as this detour, used very little prior to this, was taking terrific punishment. Travellers now doubled their verbal jests on this little city of about 11,000 inhabitants.

The work of several heavy manufacturers in Cudahy and South Milwaukee kept a constant flow of war-workers and transporters of war material on this detour and it was more than apparent that a good road was a downright necessity. At last, orders came through releasing the labor and material to pave Packard Avenue because the city had already finished the necessary underground work at a cost of $62,000.

II. Highway 62 got a record breaking start when Tomaro Contractors, Inc., completed 3,000 feet of sewer ahead of schedule.

"Gimme a brandy."
"I'll have a shell of beer."
"Old Underwood for me."
"No, no, I want Kessler's."

Here was that "old feeling." It was 5:10 and four members of a contracting organization were quenching their thirst and happily recounting the work of the day.

"How many today, 'Nick'?" asked the husky boss of a gravel hauling outfit.

"182," replied Nick Tomaro, beaming.

One hundred and eighty-two feet of 30-inch sewer in a ten-foot hole, forty-two inches wide! One hundred and eighty-two feet said with such nonchalance that an old carpenter coughed as some bourbon was surprised half way "down the hatch."

"Could have been more," said Bob Nelson, superintendent, "if those damn water, gas and power lines were marked."

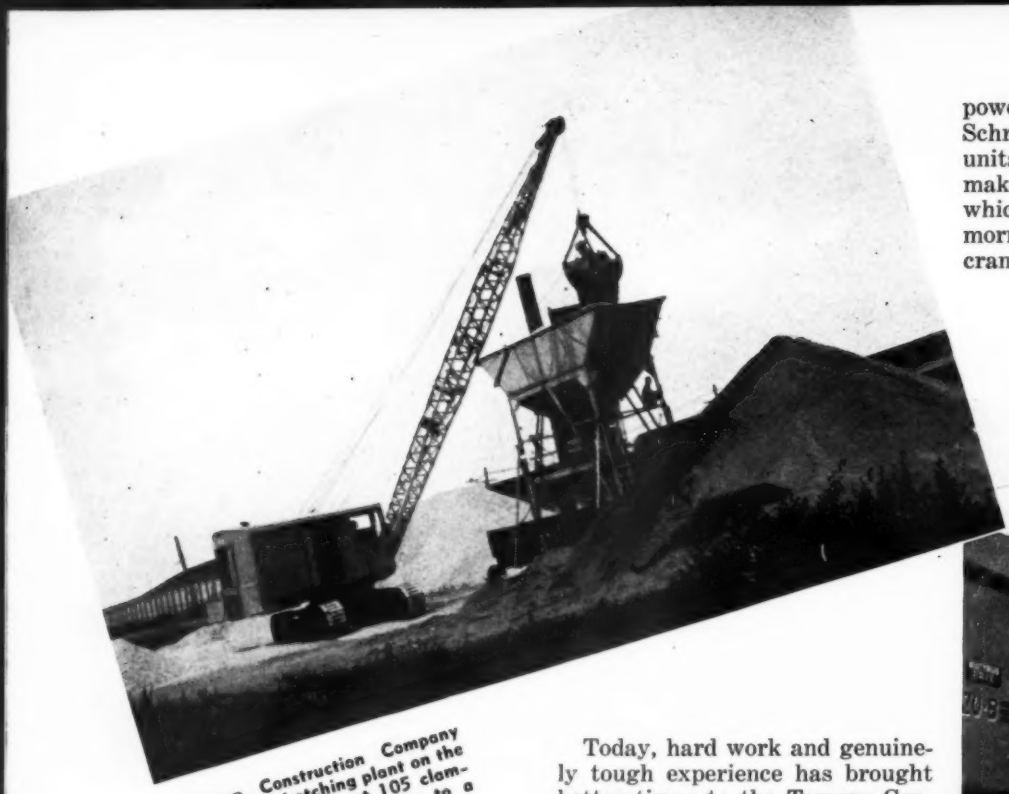
"Yeah, I lost two loads today and that means I lost six bucks." So ventured the sand boss, and he gulped his beer quickly to allay suspicion that he was kidding because he knew that his crew was "humping" all day and he had reasons to be as happy as his companions.

Tomaro Contractors, Inc., is really a family affair. Actively interested are Andrew, president of the firm and boss on the job; Clara, secretary and paymaster; Nick, ready and capable to step in when Andy is not around; Mikey (now in the Army Air Corps), driving trucks and compressors; and brother-in-law Jack Vaccaro, head truck driver.

More than a decade ago, Nick Tomaro, Sr., was carving his name in sidewalks all over Cudahy. He batted out trenches or put in waterlines to the liking of tax-payers in this bustling community. In the meantime his growing proteges were getting an education in the local schools.

Then came the crash of 1929. The Tomaro surplus was sunk in a

• Top: Kramp Construction Company employed a Koehring 27-E paver to place the 9-inch pavement. Bottom: A P&H trencher excavates a trench for 30-inch sewer pipe on the Tomaro contract.



• Kramp Construction Company set up a field batching plant on the job. Here, a Northwest 105 clam-shell crane loads aggregate to a Butler bin.

surprising amount of real estate. A large tire manufacturing firm went bankrupt and the Tomaro tenants couldn't meet the rent. In the midst of all this, Nick Tomaro, beloved citizen of the Peacock City, passed away.

Things didn't look good for his descendants. The depression meant tough going for the nine youngsters that Papa Tomaro left behind. But old Nick did leave one thing behind that all the money in the world couldn't buy. It was courage. Nick, Sr., started from scratch and his offsprings could and did, too.

They hung on to the tools and equipment like a ship-wrecked sailor to a raft. They pulled the Tomaro estate together with such remarkable efficiency that one must salute their rapid present-day rise as not just amazing but deserving. Jobs were scarce, competition tough and profits also had to be distributed to a parasite partner, debt. But the boys went to work. Two sewer jobs in near-by Racine during mid-winter were done without a hitch. Other jobs followed in southeastern Wisconsin with success.

Today, hard work and genuinely tough experience has brought better times to the Tomaro Contractors. New equipment is supplanting the old just as fast as finances and priorities permit. Many modern tools have already been installed to circumvent the rental of much needed machinery.

This is the background of the firm that played an important part in the rehabilitation of Packard Avenue more widely known as Wisconsin State Highway 62. Tourists as well as regular travellers will have kind words for this thoroughfare, since this concrete highway will afford a smooth through passage from the city limits of Milwaukee to the new stretch of highway 42 in South Milwaukee.

Two jobs were handled by the Tomaro firm to prepare the way for the final paving operations. The first was a 1000-foot storm sewer using 18, 24, 27 and 30-inch reinforced concrete pipe. The second section was 2000 feet of sanitary sewer requiring 8, 10 and 12-inch vitrified pipe. These figures do not include numerous laterals, catch basins and a meter pit. Work "clicked" so well that the contractors were several days ahead of schedule and were consequently cushioned for two days of bad weather.

Old concrete was demolished with two air chisels, pneumatic powered by Ingersoll-Rand and Schramm Compressors. These units broke up enough concrete to make way for the equipment which followed. The first job each morning for a Bucyrus-Erie 20-B crane equipped with an Owen ½-

• Tomaro's Bucyrus-Erie 20-B loads out the broken pavement to trucks to clear the way for the P&H trencher in the background.

yard rehandling bucket was to scoop out the broken pavement and load it into trucks. This took about one and a half hours. The 20-B then moved back to handle pipe with a goosenęck pipe hook suspended on the hoist cable which was disconnected from the clam bucket. The holding cable remained attached to the bucket. The 20-B used all motions to lower and set the pipe into position since it was required to work below trolley and power wires, next to street lamp standards, around corners of buildings and had to lower the pipe between narrowly-spaced temporary shoring braces. Power to boom up or down, and propel

at the same time enabled the 20-B to handle the job without damage to pipe or disturbance to shoring. Fred Spielmacher, a top notch operator in this neck of the woods, earned nothing but plaudits from the sidewalk superintendents as he made the crane cavort gently through its paces.

Ahead of the Bucyrus-Erie was a P&H trencher bailing dirt to

• A gooseneck pipe hook, suspended from the hoist cable of the 20-B, neatly handled the sewer pipe placing assignment.

two International rear dump trucks of three-yard capacity and one Chevrolet rear dump also of three-yard capacity. These three trucks making a short round-trip haul of about 500 feet kept the trencher constantly supplied with a dirt carrier. Handford Caspari ran the multi-bucket excavator with eleven buckets, four of which are equipped with side strippers. The side strippers established the trench width of 42 inches and the machine dug a maximum of 200 feet of ditch, 10 feet deep, in eight hours despite delays caused by hidden water and gas pipes.

After the pipe was set in, joints were cemented, and the trench was filled with moist sand containing a small percentage of small stone. This sand, coming from the South Milwaukee Sand & Gravel Company was hauled three miles in four three-ton trucks; two Internationals, a Ford and a Dodge.

The work of the Tomaros' progressed quickly and smoothly and the business men along Packard Avenue nodded with smiling approval as the job spurted ahead of schedule.

The underground work entailed some unusual details as well as a few plans for modernization. A local drop forging plant must dispose of a quantity of steel-treating acids which are ruinous to ordinary sewer ducts so consequently special tile and cement were required. The Milwaukee Metropolitan Sewer must refuse to build elaborate conduits for private firms and the plant has no other convenient method for the disposal of acids so the city engineer proposed a compromise.

Let the forging firm build the special tile sewer up to a main artery where the flow is abundant enough to dilute the strength of these harmful fluids. The Metropolitan Sewer Commission agreed and the industrial plant wisely accepted. This special tile tunnel was put down in the south section of Cudahy beginning at Grange Avenue and extending north to Hammond Avenue for a distance of 1564 feet. The line is composed of 12-inch vitrified tile pipe cemented with an acid resisting compound. Excavating and installation of this tile sewer was handled by Wenzel and Hennoch of Milwaukee. Their equipment consisted of a Barber-Greene trencher and a P&H ⅜-yard crane.

III. There is no steel in the pavement of Highway 62 but it is 9 inches thick.

Observant sidewalk superintendents noticed something was missing as the Kramp Construction Company laid down four long

(*Continued on page 482*)

• Partially filled with aggregate, a truck receives a fixed amount of cement direct from a railway box car. The completed batches were hauled to the Kochring paver.

Aggregat

A walking dragline equipped with a 3-yard bucket was the answer to the rising water table problem in California Rock & Gravel Company's gravel pit

By ASA LINDLEY

LIVERMORE VALLEY in California, which has given forth such products as golden wheat, lush fruits and ex-Heavyweight Champ Maxie Baer, the Livermore Butcher Boy, is giving forth again.

This time, it's not for the appetites and amusement of the American public but for the war effort.

Through the peaceful, rural countryside and between the rolling hills wind long lines of railroad gondola cars. They're bound for the Naval Bases, the Army cantonments, the airfields and the training centers that are making the West Coast impregnable to attack. To John Public they're loaded with a singularly unromantic seeming material — rock. Just the usual stuff that went into the foundations of homes and commercial buildings before old man Priorities stepped in. Because of that gentleman this aggregate is going to be used for airport runways and aprons, for munitions storage igloos, for graving docks and for the other installations of war.

Beside its agricultural assets, Livermore Valley has its principal industrial advantage in an underlying, deep strata of gravel, mixed with red clay. For years, a number of companies have steadily and quietly operated their aggre-

• **Top: Transfer stations form the connecting links between the series of conveyors that carry aggregate from pit to plant. Note the pipeline that supplies water to the washing plant. Bottom: View of a portion of the primary plant showing rotary scrubber and reciprocating washer.**

...tion Order

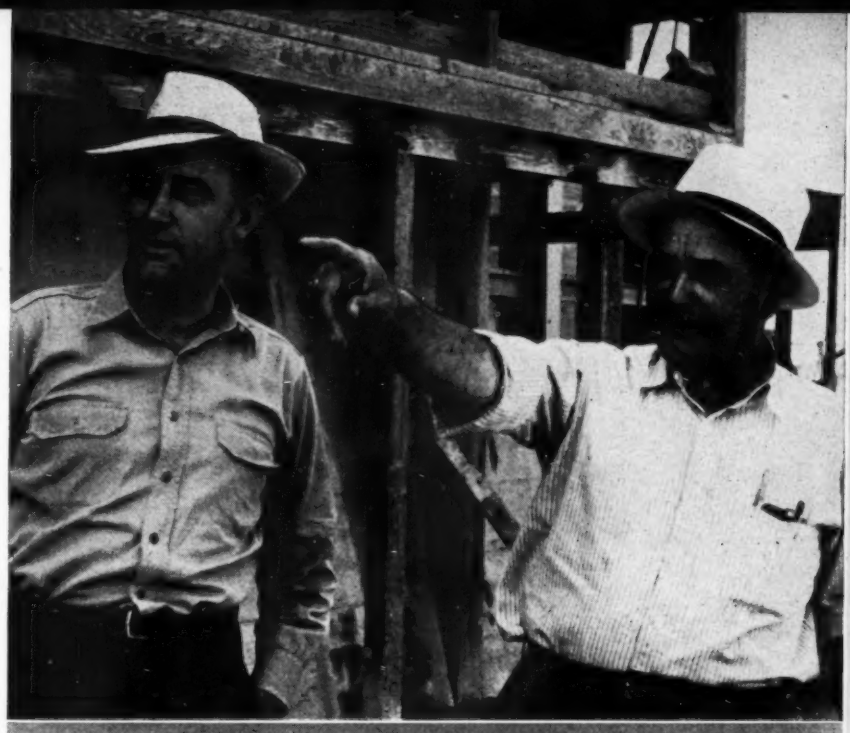
gate plants, supplying solely to the civilian requirements of the surrounding area.

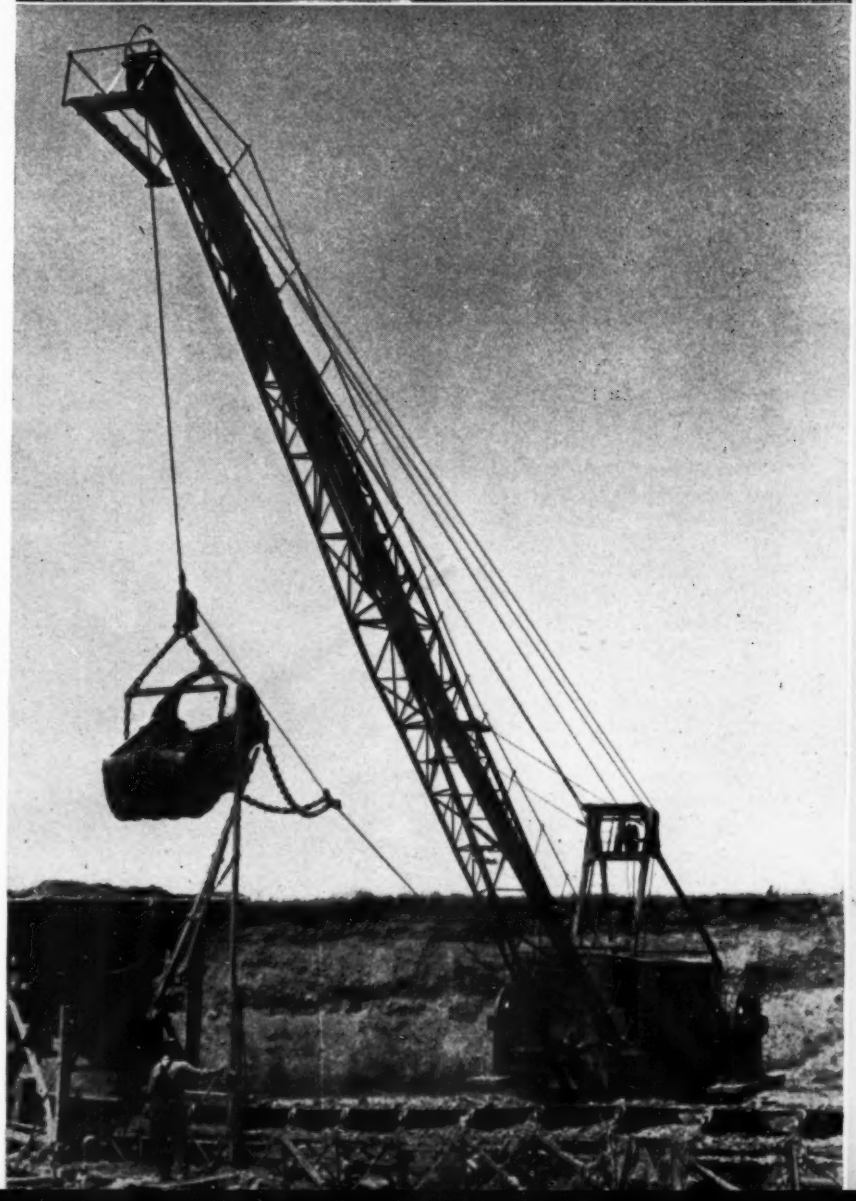
Then came, first, the "phony war," followed by total war in France, aerial blitzkrieg over England, and finally Pearl Harbor. With each phase the demand for defense materials zoomed to new altitudes, until today, with the San Francisco Bay area a key point in our line of coast defenses, the Livermore Valley aggregate plants are called upon to produce as never before. They form an important cog in the war machine.

Not the largest of the Livermore Valley aggregate plants is California Rock & Gravel Company. However, it is one of the most progressive, and it is representative of the intelligently managed plant which is operating with a minimum of waste in a day when waste cannot be tolerated. Under the guidance of Plant Manager J. S. Silva, the mill is making every minute of time and every scrap of material count.

Water Table Problem

The operation begins about one-third of a mile from the plant, where the gravel pit is located. For ten years, stripping and loading operations were accomplished with a Bucyrus-Erie 50-B shovel. Then the water table started to rise, and the pit began to fill beyond practical unwatering limits. This condition came about when the old Spring Valley Water Company, which supplied culinary water to San Francisco, was supplanted by city utility ownership following completion of Hetch Hetchy Dam. When water was no longer pumped from the old Spring Valley reservoirs in the





• Top: F. B. Roberts, office manager (left), talks over an operating detail with Plant Manager Jack S. Silva. Bottom: Equipped with a 3-yard Page bucket, this Bucyrus-Monighan 3-W walking dragline easily keeps the conveyor hopper filled. The conveyor handles about 225 tons per hour.

• Three yards of gravel and clay are eased from the Page bucket into the hopper feeding the conveyor belt. Note material control arrangement under hopper.

area, the water table began to rise.

Last December a Bucyrus-Monighan 3-W dragline was brought on the job. With this machine, the company can work from ledges and the original ground surface, excavating below water to depths of 50 feet. Normal working depth is 40 feet.

Equipped with a 90-foot boom, the all-electric dragline is Ward-Leonard controlled. It is turning out a good production job, about 225 tons per hour average, working one eight-hour shift. This production rate is limited by the needs of the conveyor feeding the crusher plant.

The 3-yard Page bucket on the machine handles a full payload in dry material, and about 2½ yards per trip during under-water work. The 1¼-inch drag and 1-inch hoist cables are of preformed manufacture. Despite daily usage in abrasive dirt and under water, the drag lines last about 45 days, while the hoist cables see an average of 120 days of use before they are replaced.

California Rock & Gravel Company's operation is unlike that of others in the vicinity in that transportation of the pit material is via conveyor rather than by truck or cars. The dragline loads into a receiving hopper with reciprocating feeder, which in turn drops the material onto a 24-inch conveyor belt. This 200-foot conveyor section is portable, and may be swung in any direction from the central point formed by its junction with conveyor section No. 2. By this arrangement, the company has eliminated intermediate transportation, the feed being at all times direct from dragline to conveyor. All belts from pit to plant have a speed of 375 fpm.

Conveyor No. 2 has a length of 575 feet; No. 3, 525 feet; and No. 4, 630 feet. They are run by Westinghouse and Allis-Chalmers motors of 15, 20 and 25 horsepower ratings. The rating, of course, depends upon the length of the conveyor section.

Six Aggregate Sizes

Six gradings of aggregates and two of sand are produced by California Rock & Gravel. Aggregate is made in these sizes: ⅛ to ¼-inch; ¼ to ½-inch; ½ to ⅞-inch; ⅞ to 1¼-inch; 1¼-inch to 1½-inch; and 1½ to 2½-inch. Fine sand passing minus 4½ mesh and coarse passing 3/16-inch are produced, while crushed rock screenings are a by-product.

The main pit belt feeds an endless stream of brownish yellow dirt up an inclined trestle to the rotary scrubber. A conical end section has holes to take minus 3¼-inch material and pass it by chutes into a reciprocating washer. California Rock & Gravel Company's engineers designed this chain-drive, drag type machine, and Link-Belt Company built it. It comprises a series of paddles mounted on parallel beams which reciprocate in an inclined trough. Waste is washed away at the bottom and gravel is dragged out over the top of the trough and onto the main plant conveyor.

Rejects (plus 3¼-inch rock) from the rotary scrubber dump into a chute and thence into the 13-inch McCully primary crusher. This machine breaks them up and passes them onto the main plant conveyor along with the material from the reciprocating washer. This conveyor has a 24-inch belt and is 270 feet long, center to center. It travels at 300 fpm.

Arriving at the plant, the material passes through the usual series of vibrating screens to separate the aggregate classifications. All rock is delivered onto a 4x14 Allis-Chalmers low-head triple deck screen. The top screen passes 1¼-inch material; the middle, ⅞-inch; and the bottom, ½-inch. Rock between ⅞ and 1¼-inch, and between ½ and ⅞-inch, goes to the bunkers.

Plus 1¼-inch rejects from the top screen are chuted onto a 4x8 A-C double deck screen. The top screen passes 2½-inch; the bottom, 1½-inch. Material between

(*Continued on page 484*)

• Plant workmen make an adjustment on one of the two Wemco screw sand classifiers. California Rock & Gravel Company's sand production set-up is unusually complete.

"Here's how you can spot the 'criminals' that steal wire rope life...

Look for them regularly... to save your time and money... and America's steel

"IF YOU WANT to get every hour of safe service that's built into your ropes, tell your maintenance men to get up on the cranes and shovels regularly . . . up where the wire rope operates. Tell them how to inspect it . . . how to look for the clues to what is damaging your wire rope and how to establish *your own standards* for deciding when it's necessary and economical to replace your wire ropes.

As a first step, tell them a rope should be judged by the condition of the most severely damaged lay . . . one rope lay being that length of rope in which one strand makes one complete revolution around the rope...

And to select the worst lay, make a counting of the broken wires. Watch to see if the breaks are concentrated in one or two strands. If this is the case, the rope will be considerably weaker than if they are evenly distributed.

You'll probably find some breaks caused by *Abrasion.* In extreme cases they look like this . . .

and even when not worn through, any removal of metal due to wear weakens the rope in direct proportion. Abrasion breaks occur most frequently where rope goes over sheaves and drums.

There may be breaks caused by *Fatigue* which look like this . . .

and occur where the rope has been bent around too small a radius too often or has been subject to vibration or whipping. Fatigue breaks also occur after the wire has been damaged by *Corrosion* which shows up as pitting on the surface of the wire. Improper lubrication is to blame and contributes to tension and abrasion as well.

There may be breaks caused by *Mechanical Abuse.* This cut or gouged wire is one example . . .

Careless handling during installation or an accident on the job may cause cut wires like this or mashed wires with flattened or spread ends. Mechanical abuse sometimes may so weaken the wire that it will fail in tension.

Finally, if there are breaks caused by *Tension* they will look like this . . .

And will show one side of the broken wire cupped and the other coned. Tension breaks are always caused by an overload on the wires, which may or may not have been weakened by abrasive wear, by corrosion, or by mechanical abuse. When tension breaks are found, it is usually obvious that the rope is unfit for further duty and in any event should be discarded.

As a last step, have a record kept of the condition and the service life of each wire rope, cut out the worst section when the rope is taken off and send it on to the manufacturer for an ultimate strength test. This will complete your inspection record and form a basis for future inspection and condemnation decisions.

Then, you'll be on the way to getting the maximum useful rope life built into every inch of Roebling "Blue Center" Steel Wire Rope—without taking chances on untimely and dangerous breakdown of equipment vital to wartime production schedules."

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, NEW JERSEY
Branches and Warehouses in Principal Cities

★ PROMPT SERVICE
★ on essential orders
★ from warehouse
★ stocks or mill

ROEBLING
"Blue Center"
STEEL WIRE ROPE
PREFORMED OR NON-PREFORMED

For your convenience in writing to John A. Roebling's Sons Co., you will find a card bound in this issue.

Field NOTES

Keep Wire Rope Performance Records

One of the findings turned up by an extensive survey of wire rope extending into practically all major industries was the fact that only a very small percentage of industrialists keep performance data or service records on major pieces of equipment, much less so-called "minor" items of material. Not infrequently heavy machines such as gantry cranes, power shovels, car dumpers, scrapers, bulldozers, and the like had no record of maintenance or repair costs behind them; no data sheet for the recording of yardage moved or performance made. And very rarely did the investigators find performance records of "minor" equipment such as wire rope, slings, sheaves, bearings, power transmission equipment, etc. This is a costly error of omission on the part of industrial management. There is, in truth, no such thing as a minor piece of equipment; more especially when such equipment is expendable material. No machine, however large or expensive, is better than the wire rope that operates it. A rope that breaks frequently, thereby throwing into unproductive idleness for hours or days, not only the machine but men as well, is certainly no "minor" piece of equipment. It becomes a major expense, but one which cannot be intelligently corrected without fully detailed information regarding rope type, construction, grade of steel, whether preformed or non-preformed, size of sheaves or drums, condition of treads, character of work, previous performance data, and other pertinent facts.

Wire rope is far more than merely something to reeve onto a machine to make it work. Wire rope is a machine of itself. An ordinary 6 x 19 rope (six strands of nineteen wires each) is a machine with 114 working, moving parts; every one of which has been drawn to a high degree of mechanical precision. And there is a vast difference in wire ropes. Most ropes may *look* alike but they aren't. There are many different constructions, each designed for a particular purpose or to fill a specific need. Preformed rope invariably gives longer and better service as a running rope on many machine installations but is ordinarily not needed for guy wires, standing ropes. In some work, such as cable tool drilling in the oil fields, non-preformed ropes have been found superior to preformed; whereas in rotary drilling where the wire lines are merely hoist ropes, preformed has grown in high favor over non-preformed.

Since wire rope isn't just wire rope, and since wire ropes differ pronouncedly in character and service it is only good management to maintain work records of every line installed. Such records kept up-to-date and studied have invariably become the means to more intelligent rope selection which not only means better and longer rope life and reduced rope replacement costs but reduced machine shutdowns and steadier production.

Rope service record forms are not difficult to make. A mimeograph or multilith stencil, readily cut by any typist, will turn out a hundred in short order. The accompanying illustration is a reproduction of such a record form developed by the American Cable Division of the American Chain and Cable Company. It is com-

WIRE ROPE SERVICE RECORD

Equipment ..... MAKE ..... MODEL OR CAPACITY

Condition of Sheaves and Drum .....

DESCRIPTION OF WIRE ROPES OR LINES

	SERVICE	LENGTH	DIA.	CONSTRUCTION	GRADE	BRAND
No. 1						
No. 2						
No. 3						

SERVICE RECORDS OF LINE NO. 1

BRAND ..... DATE INSTALLED ..... REMOVED .....
LUBRICATED (DATES) .....
WORK DONE .....

BRAND ..... DATE INSTALLED ..... REMOVED .....
LUBRICATED (DATES) .....
WORK DONE .....

BRAND ..... DATE INSTALLED ..... REMOVED .....
LUBRICATED (DATES) .....
WORK DONE .....

SERVICE RECORDS OF LINE NO. 2

BRAND ..... DATE INSTALLED ..... REMOVED .....
LUBRICATED (DATES) .....
WORK DONE .....

BRAND ..... DATE INSTALLED ..... REMOVED .....
LUBRICATED (DATES) .....
WORK DONE .....

BRAND ..... DATE INSTALLED ..... REMOVED .....
LUBRICATED (DATES) .....
WORK DONE .....

SERVICE RECORDS OF LINE NO. 3

BRAND ..... DATE INSTALLED ..... REMOVED .....
LUBRICATED (DATES) .....
WORK DONE .....

BRAND ..... DATE INSTALLED ..... REMOVED .....
LUBRICATED (DATES) .....
WORK DONE .....

BRAND ..... DATE INSTALLED ..... REMOVED .....
LUBRICATED (DATES) .....
WORK DONE .....

• This rope service record form can easily be duplicated for your own use. Sample copies are also available upon request to the American Cable Division, American Chain & Cable Company, Inc., Wilkes-Barre, Pa.

Guard that "Achilles Heel"!

● Every tire on your Bottom-Dump or Rear-Dump EUCLIDS, and other equipment you own or operate, is virtually an "Achilles Heel" — a vital point that must be given every possible protection. Here are four suggestions that will help you get the maximum service from your tires and thus keep your equipment in production longer:

Load Down Grade
Starting up steep grades from the loading area increases wear on drive wheel tires due to the tendency of the wheels to spin or slide on loose stone.

Keep Loading Area Clean
Loading, starting and stopping on loose rock or sharp stone causes unnecessary cuts and bruises — decreases the serviceable life of tires.

Fill Holes Promptly
Holes in the haul road or loading area are especially hard on dual tires because the load is supported by only one tire when the other passes over a hole.

Remove Loose Stone From Haul Road
On a hard surfaced haul road, stones press into tires instead of being compacted into the road — cuts, breaks in casings, and scuffing of traction surface result.

By giving your equipment tires more consideration and protecting them from unnecessary wear, you'll be getting the most out of an investment that may be mighty hard to replace. And even more important you'll be keeping your equipment in production for jobs that can't wait.

★ ★ ★

The EUCLID ROAD MACHINERY Co.
CLEVELAND OHIO

EUCLID
SELF-POWERED HAULING EQUIPMENT
For EARTH..ROCK..COAL..ORE
CRAWLER WAGONS · ROTARY SCRAPERS · TAMPING ROLLERS

For your convenience in writing to The Euclid Road Machinery Co., you will find a card bound in this issue.

• The vintage of the truck dates this scene to about 25 years ago, but the idea of building a wooden ramp and platform for second story dumping can still be used today. The picture was taken during the construction of a Cleveland, Ohio, building.

plete in all essential details and provides space for the record keeping of three lines each of three rope applications.

Highway Slide Problems

The removal of slides and repair of storm damage are major phases of state highway maintenance work In the 10 years since 1931, expenditures of $13,780,000 or practically one-sixth of the total of $82,656,000 required for maintenance has been used for this purpose. Some 9,000 miles of the system are located in rugged or rolling country or in the flood channel of large streams. The travel on this mileage represents two-thirds of the total travel for the entire rural state highway system. In many sections, the closing or even partial closing of the road presents an emergency situation.

Naturally, the amount of expenditure from maintenance funds varies from year to year, depending on the severity of the particular season. This is shown by comparison of the proportion of total funds required for such work as indicated below:

Year	Percentage of Expenditures for Major Slide and Storm Damage to Total Maintenance Expenditures
1931-32	12.65
1932-33	7.91
1933-34	9.55
1934-35	9.56
1935-36	16.27
1936-37	13.89
1937-38	36.21
1938-39	11.44
1939-40	19.44
1940-41	18.46
Ten-year average	16.67

The influence of extreme conditions is evident for the 1937-38 season.

In general, landslides are of the following types: (1) Slides due to weathering or erosion. These may consist of broken masses of rock or earth, or of soil or silt washed from the face of a cut into the side ditches or onto the pavement, sometimes to a depth of several feet; (2) Slippage along defined planes which become lubricated by rain or springs; (3) Crushing of the underlying formations, which are not strong enough to withstand the load when the support is removed in excavating the road prism.

All slides are failures due to insufficient frictional resistance of the soil to resist the driving force caused by its weight. They are usually caused by excess moisture in the soil, which not only increases its weight but also decreases its cohesive strength. Hydrostatic pressure developed by underground water may also contribute to earth failures.

Although every slide or slipout must be studied as an individual case, certain general principles of investigation and correction are usually applied. The study usually consists of a boring investigation, in some cases supplemented by a geological study, to determine the type of slide, the location of the sliding surface, and the presence of underground water.

Where a definite source of underground water can be located, provision should be made for intercepting the water and removing it from the slide area. In many cases, however, no definite source of moisture can be found, saturation having taken place by a more or less uniform percolation of surface waters. It is always advisable to look for shallow ponds or springs above the slide area and to drain any that may be found. Diversion ditches should always be constructed to keep surface water out of the slide cracks which have developed.

In any case of bedding plane or fault plane slides, the only possible corrective measures which can be applied are the interception of underground water which may be lubricating the slide plane and the removal of all of the loose material above the plane. In many cases where the dip of the strata is relatively flat, this type of slide is progressive and enormous quantities of material must eventually be removed. In some extreme cases, it may even prove to be more economical to relocate a portion of the highway than to attempt the removal or correction of this type of slide.

The following is a rough estimate of the total quantities involved in the correction of the slides and slipouts for two locations.

	Ridge Route	Kellog Slide	Total
Excavation (cu. yd.)	490,000	80,000	570,000
Horizontal Borings (lin. ft.)	6,300		
Diversion Trenches (lin. ft.)	38,000		
Gravel for porous drains (cu. yds.)	5,000		
24-in. culvert pipe (lin. ft.)	280		
72-in. culvert pipe (lin. ft.)	200		
Bituminous Surfacing (tons)	800	1,100	1,900

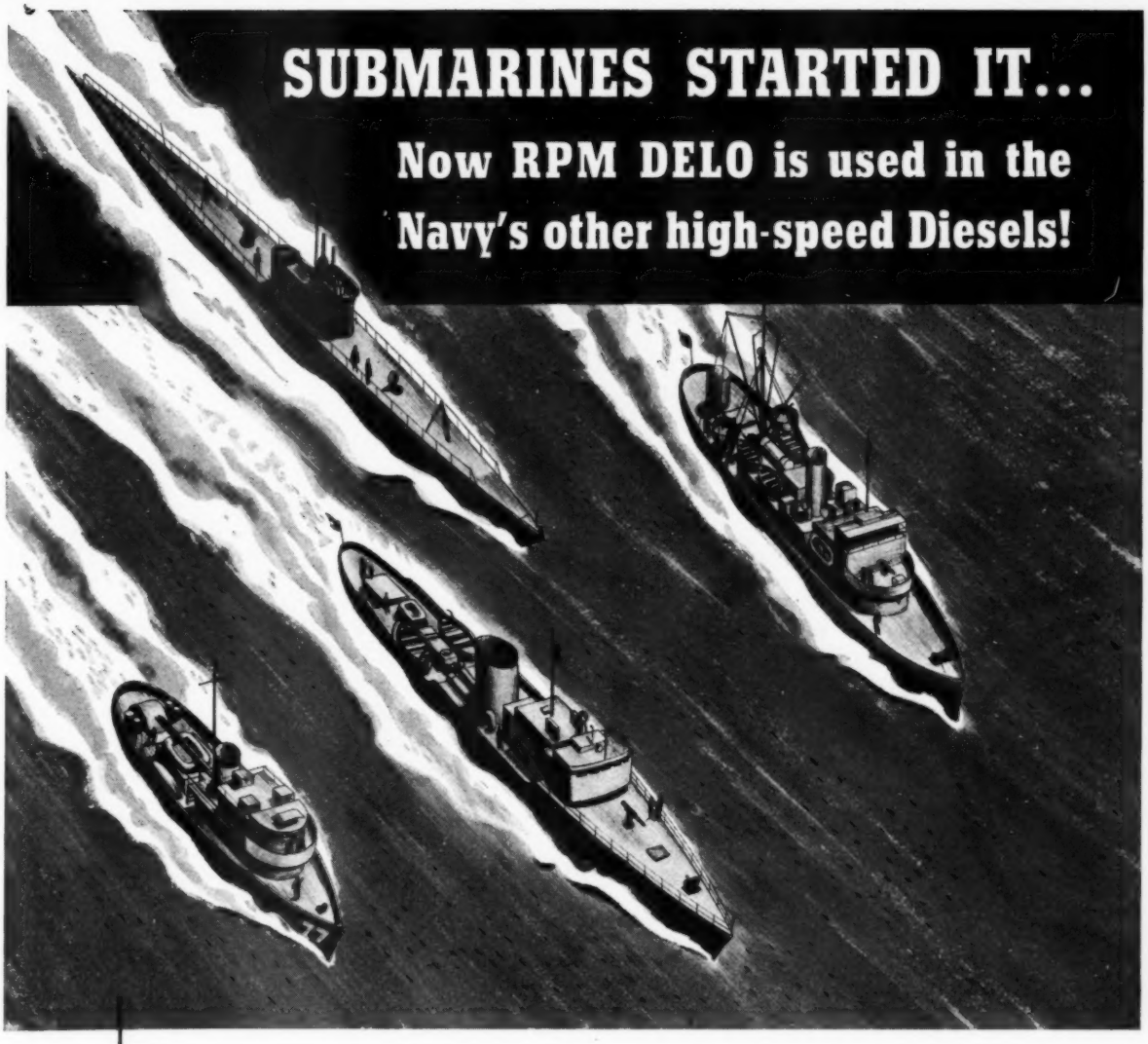
The cost of this work will be approximately $330,000.

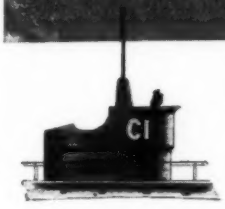
In the preliminary investigation of proposed construction projects, the soil survey and foundation investigation is becoming increasingly important. The location of the highway should be influenced to a considerable extent by conditions disclosed by geological studies and boring investigations, in order, where possible, to avoid cuts in unstable soils or in stratified rocks where the dip is unfavorable. Cut slopes should be designed sufficiently flat or should be benched to avoid major slides, and fill foundations should be adequately drained, especially where the cross-slope of the ground is appreciable. A thousand dollars spent on the preparation of a fill foundation may prevent a slipout which would cost from 10 to 30 times that amount to correct.

—*Highway Research Abstracts*

SUBMARINES STARTED IT...

Now RPM DELO is used in the Navy's other high-speed Diesels!





RPM DELO was first used by the Navy in submarines. It performed so well that now the Navy uses RPM DELO to lubricate high-speed Diesels in submarines, mine sweepers, sub chasers and ocean-going tugs!

In these vessels, throughout the Seven Seas, RPM DELO is licking some of the toughest lubricating problems in the world. We're proud that it meets the Navy's exacting tests—we're glad no other nation has an oil of such quality to use in its ships.

RPM DELO will give *your* Diesels the same dependable protection the Navy demands. No other oil combines its anti-oxidant, cleaning and non-corrosive properties. It eliminates ring-sticking and sludge trouble, lengthens the time between overhauls. Switch *now* to RPM DELO, proved under the severest tests to be the world's finest Diesel lubricating oil.

STANDARD OIL COMPANY OF CALIFORNIA

RPM DELO
DIESEL ENGINE LUBRICATING OIL

RPM DELO is marketed under the following names:

RPM DELO · Caltex RPM DELO · Kyso RPM DELO
Signal RPM DELO · Imperial-RPM DELO CONCENTRATE · Sohio RPM DELO

Ask your Diesel engine manufacturer or distributor for the RPM DELO supplier in your vicinity

For your convenience in writing to Standard Oil Company of California, you will find a card bound in this issue.

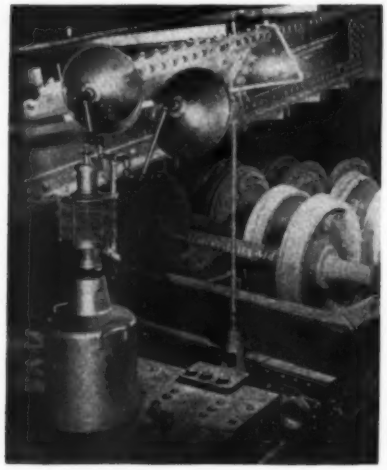
Equipment you ought to KNOW ABOUT

For further details about the equipment on this page please write to the manufacturer, mentioning Excavating Engineer.

Carbide Floodlights

Manufacturer: National Carbide Corporation, 60 East 42nd Street, New York, New York.

Claims: The new line of portable floodlights is a thoroughly dependable source of adequate lighting for construction and repair work, for routine railroad checking jobs, or for any emergency use according to the manu-



facturer. The portable floodlights may be used to maintain night shifts on construction jobs without the usual delay and expense of installing permanent lighting installations. The largest unit has two 8,000 candlepower floodlights constructed on swing joints allowing independent directional control with 16,000 candlepower concentration of light.

Anti-Freeze

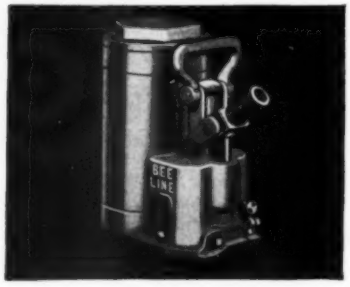
Manufacturer: Great Northern Chemical Company, Inc., Oak Park, Illinois.

Claims: "No-Freeze" is the name of this new permanent type anti-freeze which contains no critical materials and is therefore available in unlimited quantity. The product was sold in substantial quantities last winter and used by thousands of individual car owners, as well as leading commercial fleet operators, with complete success. Manufacturer guarantees "No-Freeze" against freezing down to 35° below zero; to prevent rust of any part of the cooling system; to be harmless to engine, car finish or person; not to boil off or evaporate. Also that it contains no acid, calcium chloride, sodium chloride or other inorganic salts. The product is delivered in one-gallon glass containers.

Hydraulic jack

Manufacturer: The Bee Line Company, Davenport, Iowa.

Claims: This unit serves innumerable uses, particularly work requiring a compact jack of light sturdy construction. A new principle of construction is involved

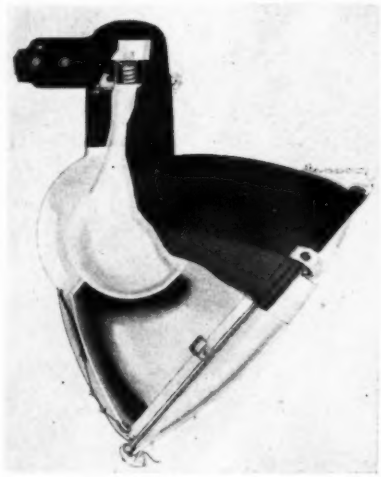


placing this jack ahead in hydraulic efficiency. Large oil ports and passages assure quick return of ram and is air-bound trouble-free. Large pressure areas require less oil pressure per ton for lifting capacity. Automatic take-up on all packing; nothing to tighten or adjust in service. The unit is of simple construction using fewer parts than required in using other heavy duty jacks. It is 74 lbs. total weight.

Floodlights

Manufacturer: Westinghouse Lighting Division, Edgewater Park, Cleveland, Ohio.

Claims: This new wide and narrow beam floodlight is designed especially for lighting shipyards, construction projects, industrial yards and sports areas. Both the wide beam and narrow beam units are equipped with a snap cover having a heat resisting glass lens, making them dust-tight and moisture-proof to prevent accumulation of dust and dirt on the reflecting surface. The reflector housing is formed from



annealed sheet iron with a green porcelain enamel finish. The wide beam unit has a white porcelain enamel inside surface, while for narrow beam applications, the forward elliptical section of the reflector is a separate piece of silvered glass, and the rear section is white porcelain enamel.

Photoelectric alarm

Manufacturer: Photoswitch, Incorporated, 21 Chestnut Street, Cambridge, Massachusetts.

Claims: An addition to the line of photoelectric protection system, the type A28L control is for outdoor and indoor use over very long ranges. The light source projects a practically invisible light beam for 350 to 700 feet and it is possible to completely surround stock yards, equipment sheds and other important areas. If the light beam is broken by intruders or saboteurs, the switch goes into operation, thereby sounding alarms operating a central station system, turning on floodlights, closing gates, etc. The control is provided with a latching unit including a push button station which may be located at any convenient point.

With Buckeye CABLE control

your tractors can do more jobs!

Buckeye Power Control Units fit all makes and models of tractors. Unit illustrated is standard width double drum medium heavy duty model. Note two decks for fairlead swivel sheaves — upper for dozer control, lower for equipment towed by tractor drawbar. A feature that means perfect balance, greater efficiency.

WITH Buckeye Power Control Units and Cable Controlled Dozers your tractors are not limited to dozing work. They become the handy men of the outfit with one, or two, lines instantly available for 101 other jobs.

The big, wide drum, Heavy Duty Hoists spool 350 ft. of ½" cable, give you over 8000 lbs. line pull and a line speed of over 300 ft. per minute.

Buckeye Power Control Units are fast—a touch of the control and the line sings into action. They conserve cable, take hold of the load smoothly and evenly with no jerks, and the sheaves are designed to minimize cable wear—you can use smaller, less expensive cable than with other winches having comparable line pulls. Big clutch and braking area plus external location means cool operation and long life. Center of line pull is low to maintain tractor balance and better traction. Controls are high leverage, within easy reach. You have your choice of Heavy or Medium Heavy Duty, single or double, wide or standard drum, models.

To speed up War jobs, unshackle your tractors with Buckeye Power Control Units. Write today and ask for specification data and prices on the models to fit your tractors.

BUCKEYE TRACTION DITCHER CO.
Findlay • Ohio

Built by Buckeye

Deletions made

Speeding Victory

Barber

THESE machines are the products of free enterprise, developed in times of peace for normal functions. They are typical of the many ingenious results of the open competition of a democratic system. Now these very machines are working to defend the system that made them possible.

There is much more to defense than munitions . . . the building of camps, airports, roads, igloos

BARBER-GREENE COMPANY

B-G FINISHER laying runways for [redacted] Bomber Assembly Plant Airport, [redacted]. The B-G Finisher receives the asphalt mix from trucks, evenly spreads it, compacts it to a uniform density, and automatically lays a level surface even over an irregular sub-base.

B-G SNOW LOADER [illegible]

B-G PORTABLE CONVEYOR [illegible]

B-G TRAVEL PLANT [illegible]

B-G "GOOSENECK" COAL LOADER [illegible]

B-G CAR UNLOADER. Many of these Barber-Greenes are being used for handling coal by the U. S. Quartermasters Corps. This Barber-Greene digs under the car and is practically automatic after being started.

...made ...e Company to comply with current censorship

...l with Greenes

—a thousand major products—requiring almost every commodity used in our normal life—now required in a sudden rush of multiplied quantities. The ingenuity and unequalled efficiency of American products combined with the American spirit is responsible for the rapid progress of the defense program—a spirit that is showing the difference between being pushed together, and pulling together.

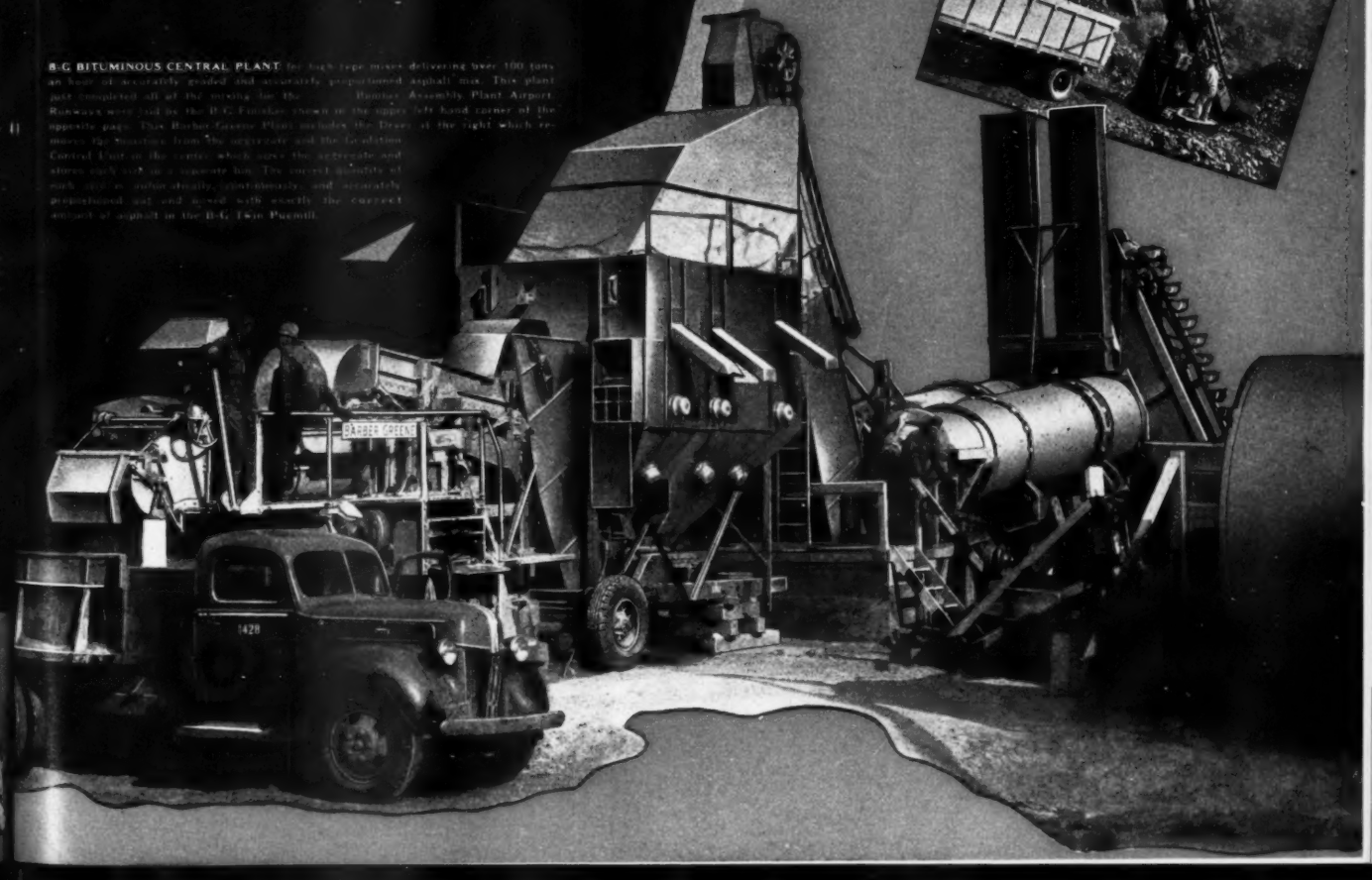
AURORA, ILLINOIS, U. S. A.

B-G LITCHER

B-G PERMANENT CONVEYORS

B-G BUCKET LOADER

B-G COAL LOADERS



B-G BITUMINOUS CENTRAL PLANT for high rate mixes delivering over 100 tons an hour of accurately graded and accurately proportioned asphalt mix. This plant just completed all of the mixing for the Runways were laid by the B-G Finisher shown in the upper left hand corner of the opposite page. This Barber-Greene Plant includes the Dryer at the right which removes the moisture from the aggregate and the Scalation Control Unit in the center which sizes the aggregate and stores each size in a separate bin. The correct quantity of each size is weighed automatically, continuously, and accurately proportioned out and mixed with exactly the correct amount of asphalt in the B-G Twin Pugmill.

NOT in the *Contract*

She (coyly): "You bad boy. Don't you kiss me again!"

Shovelrunner Ike: "I won't. I'm just trying to find out who has the gin in this party."

During a lull in A.E.F. activities in London last week, a colored boy from Chattanooga got in a poker game with a few English chaps. Picking up his cards he found four aces. Someone had just bet one pound and the colored boy said, "I don't know how yo' boys count yo' money, but I'll just raise yo' one ton."

Teacher (pointing to deer at the zoo): "Johnny, what is that?"

Johnny: "I don't know."

Teacher: "What does your mother call your father?"

Johnny: "Don't tell me that's a louse!"

He was determined to pass his favorite tavern on his way home. As he approached it he became somewhat shaky, after plucking up courage, he passed it. Then, after going about fifty yards he turned and said to himself: "Well done, Pat, me boy. Come back and I'll treat ye."

Witness: "I think—"

Belligerent Lawyer: "We don't care what you think. What we want to know is what you know."

Witness: "If you don't want to know what I think, I may as well leave the stand. I can't talk without thinking. I'm not a lawyer."

A city court official, after explaining the history of the American flag to a group of aliens seeking citizenship papers, asked one of them: "Tell me, what flies over the city hall?"

The alien blinked a minute, and replied: "Peejins."

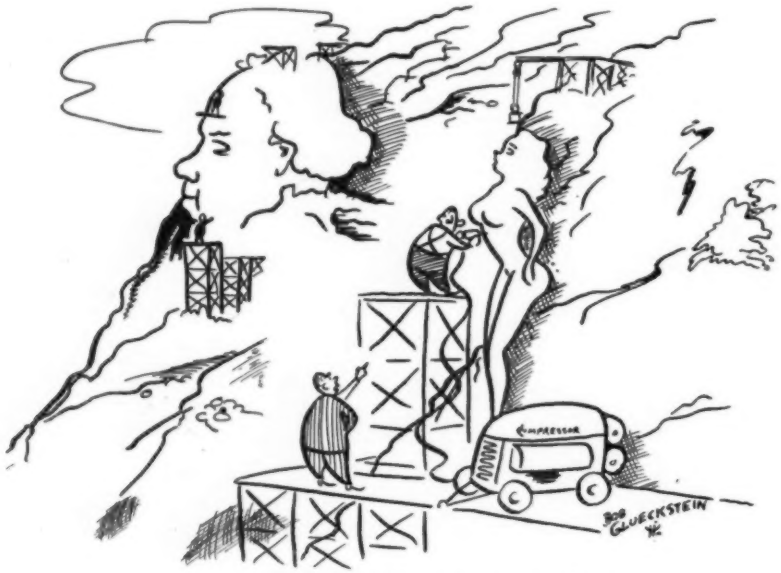
Gal: "The jury awarded me $50 for my head injury and $5,000 for my legs."

Guy: "What was wrong with your legs?"

Gal: "Not a thing, brother!"

You never hear jokes about the salesman and the farmer's daughter any more. She's gone to town.

And when the salesman gets enough money saved up, he'll probably try to buy a farm.



"See here, Jones, let's stick to the main subject!"

Occidentally Speaking

A Chinese boy learning English is credited with the following thesis on the banana.

"The banana are great fruit. He are constructed in the same architectural style as sausage, different being skin of sausage are habitually consumed, while it is not advisable to eat wrappings of banana.

"The banana are held aloft while consuming, sausage are usually left in reclining position. Sausage depend for creation on human-being or stuffing machine, while banana are pristine product of honorable Mother Nature.

"In case of sausage, both conclusions are attached to other sausage; banana, on other hands, are attached one end to stem and opposite termination entirely loose. Finally, banana are strictly of vegetable kingdom, while affiliation of sausage often undecided."

The girl who, incandescent glows
Where sun and wind have kissed her
Is less alluring to her beaus
When she begins to blister.

The modern mechanical genius is the guy who can shift gears in an Austin without getting his face slapped.

A drunk, watching a revolving door saw a man walk in. Soon the revolving door revealed a pretty girl stepping out.

"It's a good trick," said the drunk, "But I still don't shee what that guy did with hish clothes."

When Johnny and Mary were young, Johnny was crazy about soldiers and Mary was wild about painted dolls. My — how things have changed since then.

The meek are not only inheriting the earth, but in some countries they are getting their faces pushed into it.

"Miss Epsom," said the colored parson impressively, as he led her into the brook for baptism, "I'se gwine to lead you out inter dis heah stream and wash out every spot 'o sin you's got!"

"Lawsy, pahson," giggled the erstwhile frolicsome damsel, "in dat li'l ole shallow creek?"

PRACTICAL METHODS OF LUBRICATING YOUR WIRE ROPE

. . . to help you get longer service . . . to help you conserve steel

The benefit derived from systematic lubrication of wire rope is one of those apparently intangible things that are difficult for the average user to find among his many operating problems. However, laboratory and scientifically controlled field tests have proved that wire rope, like any machine part, lasts longer if it is kept well lubricated.

What are some simple ways to lubricate wire rope on your job?

Preparation

It is very desirable that the rope be clean and dry. A jet of air, steam, or wire brushing, followed by a period in which the rope is allowed to dry, are some of the methods used preparatory to applying the lubricant.

First, you can brush the lubricant on to the rope

FIG. 1

Illustrated, in Figure 1, is one easy and effective method of applying lubrication. Dip the brush into the lubricant and apply. In some cases a rag or piece of sheepskin is dipped in the lubricant and used to swab the lubricant on to the rope.

Applying by hand with leather gloves

FIG. 2

Another simple method is shown in Figure 2. Leather is preferred to canvas, because of its greater protection and less penetration of the grease.

This method is especially good where a heavy, non-flowing lubricant is applied. It is often desirable to heat lubricant slightly to get a smoother, better application.

You can make a simple lubricating device

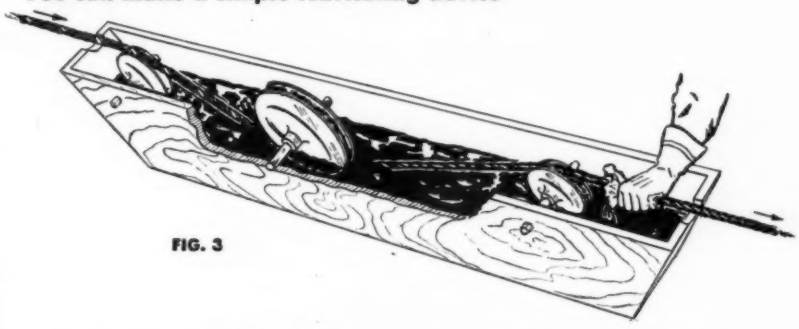


FIG. 3

A wooden trough with a sheave mounted on a shaft does a good job.

Such a trough, or slush box, is illustrated in Figure 3. The rope is run over the end of the trough, under the sheave, and out the other end so that the rope runs through the lubricant. A rag or swab held in place at the outgoing end wipes off excess lubricant. A slush box for vertical ropes is shown in figure 4.

Proper lubrication helps to seal in the Macwhyte internal lubrication that covers each wire during the manufacture of the rope. It helps to keep out water and dirt, and guards against corrosion.

Regular inspection of the rope with frequent applications of lubricant produces better results than heavy coatings less frequently applied.

The methods illustrated are those in most common use and cover most wire rope applications. Various methods used in service often depend upon the particular type of lubricant and whether it is applied hot or cold.

The use of wire rope varies so greatly that it is not possible to set forth here any particular types of lubricant to use. Macwhyte engineers are always glad to give you the benefit of their experience in special cases.

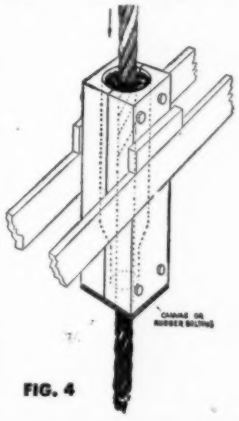


FIG. 4

This is number 12 in a series of informative articles prepared by the Macwhyte Wire Rope Company. All articles in this series are available on request.

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Shots from the FIRING LINE

Department of Commerce Construction Volume Review

The volume of new construction in the second quarter of 1942 was $3,297 million according to the U. S. Department of Commerce.

This was 25 per cent greater than the preceding quarter and 28 per cent above the same period last year. The record level was reached in spite of a sharp contraseasonal decline in private construction. Public war construction, one and a half times as large as in the previous quarter and almost three times as large as in the same period a year ago, accounted for the rise.

The shift from private to public war construction is likely to continue during the remainder of 1942. However, because of the increasing pressure of material and labor shortages, total construction will probably begin to taper off toward the end of the year. It is estimated that the total volume of construction in the last six months will be about $5,800 million as compared with $5,934 million in the first six months. The factors that will impede further expansion have already been foreshadowed by the recent War Production Board decision to suspend construction on a large shipyard.

The second quarter decline in private construction was chiefly the result of a $70 million drop in non-residential building. Commercial building declined by nearly one-half from the previous quarter's total. Private industrial construction was a third lower in the second quarter. Public utility construction showed only a slight decline in the second quarter; but in the last half of the year it is expected to be only $260 million as compared with $348 million in the first half.

Residential and farm construction were the only types of private construction that increased during the second quarter. The two per cent rise in residential construction compares with a 45 per cent rise in the second quarter last year. Moreover, it can be ascribed entirely to work already started in the first quarter. Work begun in May and June, reflecting Conservation order L-41 and shortages of materials, was only about a third of that begun in previous months. It is anticipated that private residential construction for the last six months of 1942 will be slightly less than the $480 million recorded for the second quarter alone. Farm construction showed an approximately normal seasonal increase. The priority order applying to farm buildings of $1,000 and over apparently had little effect thus far. Because of material and labor shortages the level in the last half of the year might be expected to be about 10 per cent below that reached in 1941.

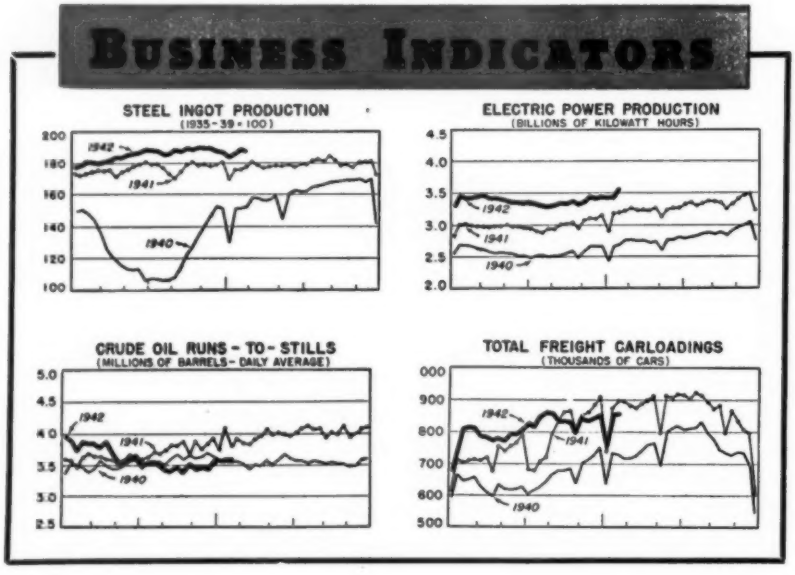
Declines are thus probable in all types of private construction. The total will probably not exceed $1,037 million in the last half of the year; three-fifths of the volume for the first six months and only thirty five percent of that recorded in the last half of 1941. By the end of the year private construction will represent only about 15 percent of all construction.

To date, according to U. S. Commerce Department estimates, public war construction has increased at a rate which more than offset the declines in private and other public construction. In the second quarter of 1942 public war construction, which includes military and naval construction, war plant construction, war housing and defense public works, and strategic access highways, totaled $2.1 billion or almost 90 percent of all public construction and 65 percent of all construction activity.

Military and naval construction alone was $1,137 million in the second quarter of 1942, twice the 1941 quarterly average. The estimate of $2,800 million for the last six months means a rate

NEW CONSTRUCTION ACTIVITY
(in millions of dollars)

	1941			1942		
	First Quarter	Second Quarter	Last Six Months	First Quarter	Second Quarter	Estimated Balance of Year
Total New Construction	2,278	2,573	6,294	2,637	3,297	5,792
Total Private	1,016	1,323	2,922	869	848	1,037
Residential building (non farm)	508	740	1,633	470	480	470
Non-residential building	327	318	661	190	121	145
Commercial	85	105	198	54	28	25
Industrial	188	156	334	95	63	95
All Other	54	57	129	41	30	25
Farm Construction	30	90	180	27	81	162
Dwellings	18	53	105	15	45	90
Service	12	37	75	12	36	72
Public Utility	151	175	448	182	166	260
Total Public Construction	1,262	1,250	3,372	1,768	2,449	4,755
Military and Naval	580	318	1,161	575	1,137	2,800
Non-residential building	237	400	1,034	732	857	1,150
Industrial	165	336	899	676	801	1,100
All Other	72	64	135	56	56	50
Highway	220	255	538	203	194	200
Sewage Disposal and Water Supply	29	30	56	28	30	40
Residential	75	118	286	105	130	415
All other federal	96	97	232	103	85	130
Misc. Public Sew. Entr's	25	32	65	22	16	20



• Going north on Rhode Island's Nooseneck Hill Road, State Highway No. 3 on your road map, the motorist travels an inviting 4-lane highway.

well above that for the second quarter.

In contrast to the further expansion of military construction, public industrial construction, increasing nearly 20 percent in the second quarter, is expected to decline in the last six months. Attempts are being made to substitute less critical materials and to build cheaper structures so that the additions to capacity will probably not fall by as much as the dollar volume. But the stage when construction of industrial plants can be undertaken only at the expense of current armament production is rapidly being approached.

Public war housing which was $235 million in the first half of the year is expected to be in the neighborhood of $400 million in the last half of the year. But even this substantial increase will not compensate for the sharp reduction in private residential construction. Moreover, by the end of the year some tapering off in war housing is probable.

In contrast to the large increases in public war construction, other segments of public construction fell nearly 20 percent in the second quarter. These expenditures can be expected to fall more sharply in the last half of the year since public agencies are reviewing all construction projects and eliminating those not directly related to the war.

Ickes Curbs Scrapping of Usable Equipment

Secretary of the Interior Harold L. Ickes has instructed all field engineers of the Bureau of Mines to prevent, if possible, the scrapping of usable second-hand mining equipment in the current salvage drive.

According to Mr. Ickes, reports have been received that valuable and non-replaceable mining machinery in workable or repairable condition was being picked up and destroyed for scrap in the salvage drive. In addition, the reports indicated, ore reduction and treatment machinery, such as kiln equipment, crushers, ball mills, etc., are being scrapped.

"Every piece of usable or repairable mining equipment is absolutely vital," Secretary Ickes said, "because it cannot be replaced. It would be a grave mistake to take this class of material for destruction for scrap.

"The Department of the Interior is counting on putting to use every secondhand piece of mining machinery in its program to increase vital mineral production. Now reports reach us that misguided enthusiasts are buying up such equipment for scrap.

Secretary Ickes asked War Production Board officials to instruct their salvage drive representatives to protect all usable or repairable mining equipment from scrapping. Destruction of such machinery, he said, would spell the end of development and expansion of small mines with devastating effect on mineral production.

Secretary Ickes took the matter up with Donald Nelson, Chairman of the War Production Board, who agreed to instruct salvage campaign officials in the field not to pick up mining machinery unless its release was approved by Bureau of Mines engineers.

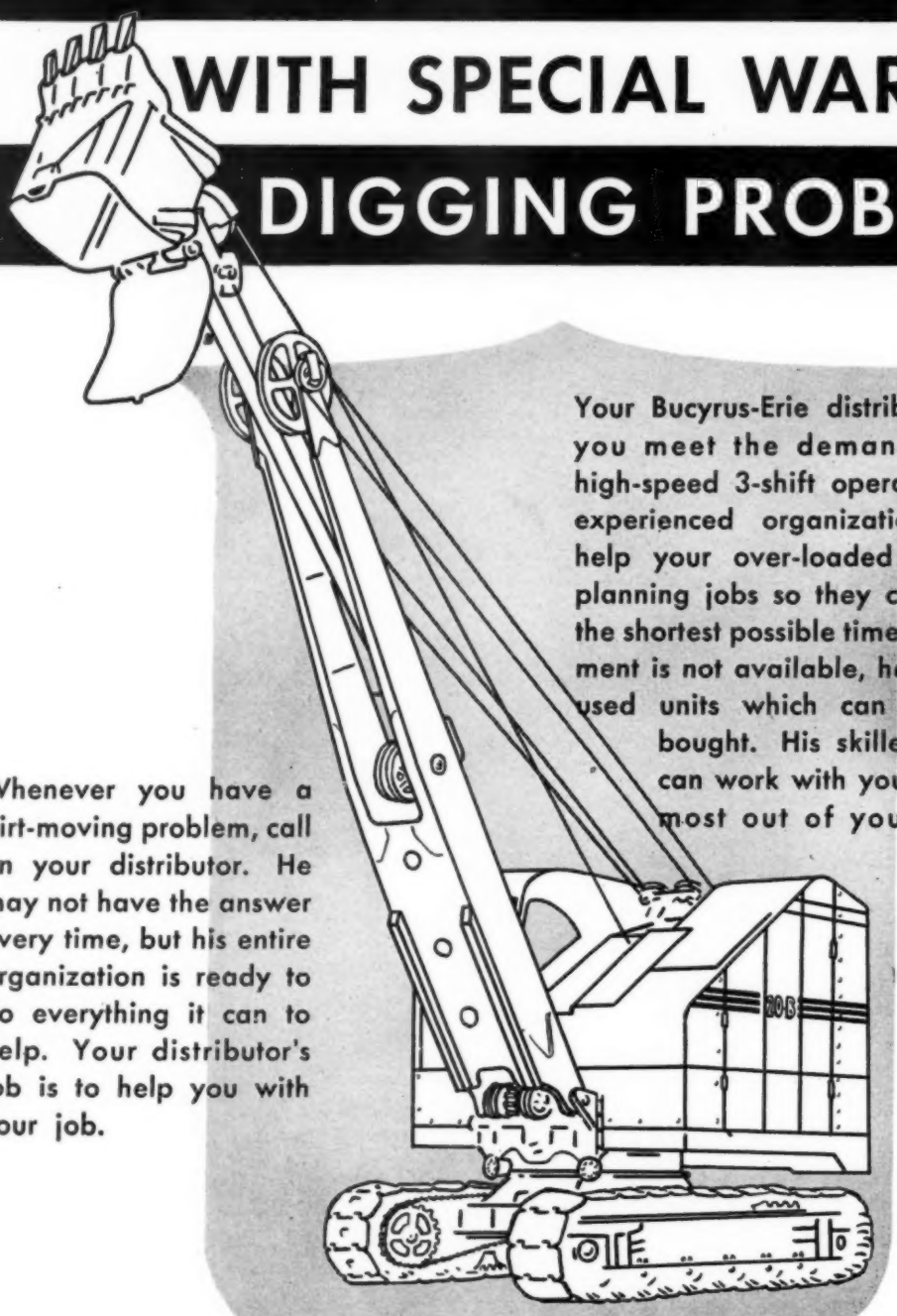
Central America Road Financed

By Bethune Jones

Construction of 625 miles of "all-weather pioneer road" from the southern border of Mexico to Panama will be financed by the United States government in a move to increase trade with the Central American republics, according to announcement July 27 in Washington by the State Department, which said that the roadway would

• This job called for the erection of 4,500-pound steel sections to a height of 40 feet, so N. A. Degerstrom of Spokane, Washington, rigged a 40-foot cedar pole on his Bucyrus-Erie 10-B dragline to turn the trick. The temporary boom extension was 16 inches in diameter at the butt and ten inches at the top.

LET YOUR DISTRIBUTOR HELP WITH SPECIAL WARTIME DIGGING PROBLEMS



Your Bucyrus-Erie distributor can help you meet the demands of today's high-speed 3-shift operation. His job-experienced organization can often help your over-loaded executives in planning jobs so they can be done in the shortest possible time. If new equipment is not available, he may know of used units which can be rented or bought. His skilled service men can work with you in getting the most out of your equipment.

Whenever you have a dirt-moving problem, call on your distributor. He may not have the answer every time, but his entire organization is ready to do everything it can to help. Your distributor's job is to help you with your job.

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Whenever you have a dirt-moving problem, get in touch with the nearest District Office or Distributor listed below. The entire experience and facilities of these members of the Bucyrus-Erie organization are available for your use in getting new or used equipment, and in getting the most in performance from the equipment you now have.

for
- SHOVELS
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'Phone or Write the Nearest Distributor or Branch Office Listed Below.

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- LARGE SHOVELS
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MULBERRY: Mulberry Supply Co. Phone 51.
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DULUTH: Wm. H. Ziegler Co., Inc., 304 Lake Ave., So. Phone Melrose 681.
MINNEAPOLIS: Wm. H. Ziegler Co., Inc., 2331 University Ave., S. E. Phone Gladstone 7971.
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POUGHKEEPSIE: H. O. Penn Machy. Co. Phone Poughkeepsie 4408.
*SYRACUSE: Bucyrus-Erie Company, 303 Draper Ave. Phone 6-1078.
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CLEVELAND: W. T. Walsh Equipment Co., 3088 W. 106th St. Phone Clearwater 4400.
OKLAHOMA, TULSA: Leland Equip. Co., 515 W. Archer St. Phone 4-1114.
OKLAHOMA CITY: Leland Equip. Co., 1726 N. W. 5th St. Phone 2-4550.
OREGON, PORTLAND: Clyde Equipment Co., 17th & Thurman Streets. Phone Broadway 5561.
PENNSYLVANIA, PHILADELPHIA: Furnival-Rimmer Co., Lancaster Ave. at 54th St. Phones Trinity 5200 and West 1617.
BRADFORD: Beckwith Machy. Co., 361 Congress St. Phone 3166.
HARRISBURG: Beckwith Machy. Co., 730 So. 10th St. Phone 4-4064.
WILKES-BARRE: Beckwith Machinery Co., 249 Market St. Phone Kingston 7-1111.
*PITTSBURGH: Bucyrus-Erie Co., 1705 Clark Bldg. Phone Atlantic 4815.
PITTSBURGH: Beckwith Machinery Co., 6550 Hamilton Ave. Phone Montrose 4200.
TENNESSEE, KNOXVILLE: Brooks Equipment & Mfg. Co., 408-10 Davenport Rd. Phone 3-7135.
MEMPHIS: Road Builders Equipment Co., Third and Calhoun Sts. Phone 6-6470.
TEXAS, DALLAS: Bucyrus-Erie Co., 1806 Tower Petroleum Bldg. Phone Central 2943.
ABILENE: R. B. George Machinery Co. Phone 6613.
AMARILLO: R. B. George Tractor & Machy. Co. Phone 6185.
DALLAS: R. B. George Machinery Co., 1135 S. Lamar St. Phone L. D. 455.
EL PASO: Tri-State Equipment Co., 500 E. Overland Ave., Phone Maine 1526.
HOUSTON: Gulf Tractor & Equip. Co., 3100 Polk Ave. Phone Preston 4103.
LUBBOCK: R. B. George Tractor & Machy. Co. Phone 3131.
PECOS: Tri-State Equipment Co.
SAN ANTONIO: Wm. K. Holt Machy. Co., West Harding Ave. Phone L. D. 331.
TYLER: R. B. George Machinery Co. Phone 4383.
UTAH, SALT LAKE CITY: The Lang Co., 267 W. First South. Phone Wabatch 6693.
VERMONT, BARRE: Reynolds & Son, Inc. Phones 334—335.
VIRGINIA, RICHMOND: Virginia Tractor Co., Inc., 1628 W. Main St. Phone 5-9138.
ROANOKE: Virginia Tractor Co., 515 Norfolk Ave., S.W. Phone 2-3496.
WASHINGTON, SEATTLE: Clyde Equipment Co., 3410 First Ave. South. Phone Main 1235.
*SEATTLE: Bucyrus-Erie Co., 3408 First Ave., So. Phone Main 6424.
SEATTLE (for Alaska): Northern Commercial Co., 419 Colman Bldg. Phone El. 8830.
SPOKANE: Construction Equipment Co., 1118 Ide Ave. Phone Broadway 5076.
WEST VIRGINIA, CLARKSBURG: General Equip. Co., Inc., 414 N. Fourth St. Phone 3198.
HUNTINGTON: Chas S. Porter Supply Co., 424 Fourth Ave. Phone 2-6651.

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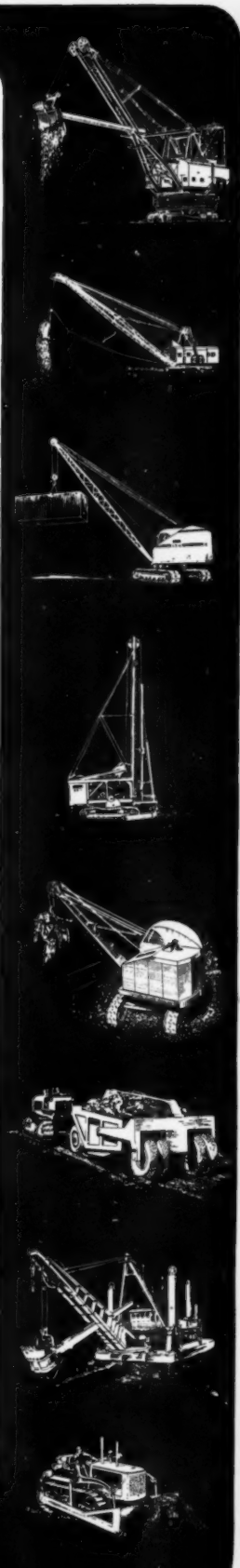
BRITISH COLUMBIA, VANCOUVER: Finning Tractor and Equip. Co., 940 Station St. Phone Seymour 7895.
MANITOBA, WINNIPEG: Kipp-Kelly, Ltd., 68 Higgins Ave. Phones 9-2507—9-2508.
NEWFOUNDLAND, ST. JOHN'S: Newfoundland Tractor & Equip. Co., Ltd. Phone 1797.
ONTARIO, TORONTO: F. H. Hopkins & Co., Ltd., Commerce & Transportation Building. Phone Elgin 4094.
QUEBEC, MONTREAL: F. H. Hopkins & Co., Ltd., 340 Canada Cement Bldg., Phillips Square. Phone Plateau 1136.



Bucyrus-Erie

GENERAL OFFICES: SOUTH MILWAUKEE WISCONSIN, U.S.A.

serve as a guide for completion of the Central American link of the Inter-American highway, of which 1,000 miles have been completed.

With all arrangements made with Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica and Panama, the announcement said that surveying had begun and that construction work would be started soon.

Besides permitting road traffic from the end of the existing standard gauge railway in Mexico to the Canal Zone, the work will help later in completion of the permanent highway.

Proposed minimum construction standards for the new link were announced as providing for a roadway width of from 10 to 16 feet, with an 8-inch gravel surface, average maximum grades of 10 per cent and average maximum curvature of 30 meters.

"The completion of this road," the announcement added, "will not only be of strategic importance, in that it will link the continental United States with the Canal Zone by a wholly overland transportation system, but also it will alleviate in some degree the transportation difficulties of the Central American countries, which have hitherto depended in large measure upon water transportation.

"It is also expected that the contemplated construction will ease the economic difficulties which the Central American countries are facing as a result of the disruption of their foreign trade caused by the war.

"Arrangements have been made for the fullest possible use of local facilities, including labor, equipment and materials.

"The plan to complete the Inter-American highway as a pioneer road will not modify the plan to construct a permanent Inter-American highway contemplated by the Act of Dec. 26, 1941.

"By this act Congress authorized the expenditure of $20,000,000 toward the construction of a permanent Inter-American highway in collaboration with the Central American Republics.

"The present plan will, however, permit through traffic at a much earlier date than originally contemplated and will facilitate the construction of the permanent highway, on the line of which the pioneer road is to be built."

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2-42

NSGA and NCSA Safety Awards

With a larger enrollment than in any previous year, and a larger number of man-hours of work represented, the 13th annual safety competition conducted by the Bureau of Mines, United States Department of the Interior, in cooperation with the National Sand and Gravel Association for the promotion of accident prevention at sand and gravel plants, has just been concluded. Companies that participated in the contests of both 1940 and 1941 reduced their accident rates in 1941. However, the enrollment of new companies for the first time in 1941 resulted in higher rates for the entire group of enrolled companies in 1941 than in 1940.

The Bureau of Mines conducts these annual contests to promote safety and to assist in reducing the number of accidents to employees in sand and gravel plants. Enrollment in the contest in 1941 covered 88 plants, and these plants worked 5,321,489 man-hours. Two fatalities and 173 nonfatal injuries occurred during the contest year.

Two bronze trophies provided by Rock Products magazine are to be awarded to plants having the best safety records. One trophy is awarded to the plant having the best safety record among plants working 100,000 or more man-hours. The other trophy is awarded for the best safety record among plants working less than 100,000 man-hours. In addition to the trophies, each plant working the entire year without a lost-time injury is awarded a certificate of merit.

The Chelsea lake plant, operated by the Missouri Portland Cement Co., won the trophy in the group that worked 100,000 or more man-hours. This plant, located in Memphis, Shelby County, Tennessee, worked 116,726 man-hours in 1941 without a disabling injury.

The No. 2A wet-pit plant, operated by the American Aggregates Corporation, won the trophy in the group

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TO EXECUTIVES:

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Even More...

New Treasury Ruling Permits Purchases UP TO $100,000, in any Calendar Year, of Series F and G WAR BONDS!

The Treasury's decision to increase the limitations on the F and G Bonds resulted from numerous requests by purchasers who asked the opportunity to put more money into the war program.

This is not a new Bond issue and not a new series of War Bonds. Thousands of individuals, corporations, labor unions, and other organizations have this year already purchased $50,000 of Series F and G Bonds, the old limit. Under the new regulations, however, these Bond holders will be permitted to make additional purchases of $50,000 in the remaining months of the year. The new limitation on holdings of $100,000 in any one calendar year in either Series F or G, or in both series combined, is on the cost price, not on the maturity value.

Series F and G Bonds are intended primarily for larger investors and may be registered in the names of fiduciaries, corporations, labor unions and other groups, as well as in the names of individuals.

The Series F Bond is a 12-year appreciation Bond, issued on a discount basis at 74 percent of maturity value. If held to maturity, 12 years from the date of issue, the Bond draws interest equivalent to 2.53 percent a year; computed on the purchase price, compounded semiannually.

The Series G Bond is a 12-year current income Bond issued at par, and draws interest of 2.5 percent a year, paid semiannually by Treasury check.

Don't delay—your "fighting dollars" are needed *now*. Your bank or post office has full details.

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War Savings Bonds

This space is a contribution to America's All-Out War Program by EXCAVATING ENGINEER

working less than 100,000 man-hours. This plant, located in Columbus, Franklin County, Ohio, worked 73,320 man-hours in 1941 without a disabling injury.

A slight reduction in the accident-frequency rate among men employed in quarrying and crushing stone was revealed for the year 1941 compared with 1940 by reports from companies that were enrolled in a yearly safety contest conducted by the Bureau of Mines, United States Department of the Interior. The contest was conducted in cooperation with the National Crushed Stone Association.

Reports from companies that participated in the contest of 1941 covered 51 plants, of which 4 were underground operations and 47 were open quarries. Stone-crushing plants connected with the enrolled quarries or mines were also included. The contest was the 16th consecutive safety competition conducted by the Bureau of Mines for the prevention of accidents in the crushed-stone industry.

Men employed at the 51 plants worked a total of 6,369,155 man-hours in 1941. Accidents during the year killed 3 men and injured 119, each injury resulting in at least 1 day of disability. The accident-frequency rate, covering fatal and nonfatal injuries, was 19.16, compared with 19.64 for the previous year.

Because of the 3 fatalities in 1941, compared with only 1 in 1940, the accident-severity rate increased in 1941, as each fatality is weighted as the equivalent of 6,000 days of disability. Hence, the severity rate, which covers fatal and nonfatal injuries, rose from 3.58 per thousand man-hours of employment in 1940 to 4.79 in 1941.

According to the rules under which the contest is conducted, the winner of the competition is the plant that establishes the lowest accident-severity rate. The winning plant is presented with a safety trophy provided by the Explosives Engineer magazine. The trophy is a bronze plaque on which is portrayed in bas-relief the quarry scene on the pedestal of the "Sentinels of Safety" trophy, which is the award for the National Safety Competition. Each plant, other than the trophy winner, that operates throughout the year with an accident-free record receives honorable mention and is presented a parchment reproduction of the quarry scene on the bronze plaque, and each employee of all the plants with accident-free records is presented with a certificate of honor. The trophy and parchment reproductions are usually formally presented at the annual conventions of the National Crushed Stone Association.

The 1941 award winner was the No. 3 mine of the Columbia Quarry Company. This mine, located at Valmeyer, Monroe County, Illinois, operated 159,569 man-hours without a lost-time or disabling injury to any employee. This is the first time since the contests were inaugurated that the award was won by an underground mine. This mine also received honorable mention in 1931, 1932, 1933, and 1936 for operating with perfect safety records.

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Kern County, California Makes Its Bullgrader Pay

By Floyd Suter Bixby

Most heavy construction men are well aware of the many different kinds of work that a controlled blade on the front end of a tractor will do. To them these uses have become commonplace in the past several years. Despite this there are still counties and municipal programs which have not yet treated themselves to the full advantage of having a unit of this type.

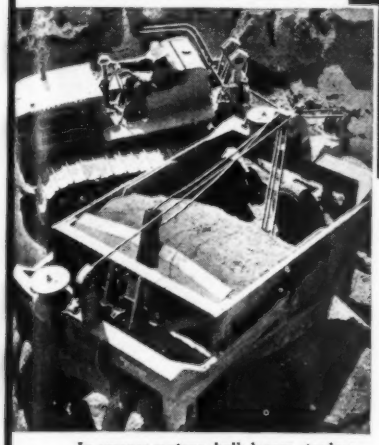
More and more counties are incorporating the advantage of this simple machine into their maintenance and new work. It has generally been proved that the cheapest way of moving short haul excavation for distances up to 200 feet is with a Bullgrader.

A rather typical example of this progressive trend toward lowered dirt moving costs is shown in the operations of Road District No. 3 of Kern County, California. This organization, with headquarters in Bakersfield, has succeeded in lowering their costs to a point where

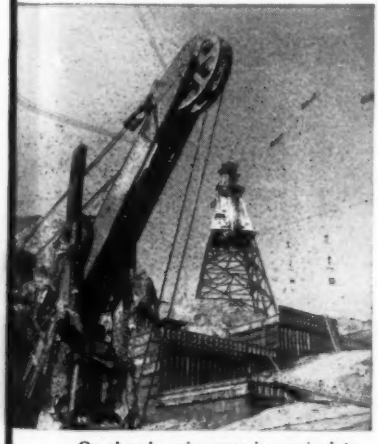
For your convenience in writing to The Osgood Company, you will find a card bound in this issue.

Connecting American Tiger Brand Locked Coil Track Cable to cableway tower at Shasta Dam. Photo by courtesy U. S. Department of the Interior.

Because frequent bending is necessary for this class of service, wire ropes for erection derricks should be free from liveliness and twisting tendencies. They should also have maximum fatigue-resisting properties. Tiger Brand Excellay Preformed meets all these requirements satisfactorily and economically.



In scraper wagons, bull dozers, graders and similar equipment, drums are unusually small, and overwinding cannot be avoided. Tiger Brand Excellay Preformed offers just the right combination of characteristics to resist the abuse, bending and abrasive conditions of such service.



On shovels, wire rope is required to bend repeatedly over drums and sheaves and is subjected to shock loads, vibration and external wear. Tiger Brand Excellay Preformed Wire Rope, because of its strength and superior fatigue-resisting properties, will improve service on this class of equipment.

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Good Wire Rope

Take care of what you have... use it properly... make it last longer

JUST check over in your mind the important equipment that requires wire rope for its operation — cableways, tramways, shovels, draglines, cranes, derricks, scrapers, to mention a few. Then think of the vital part such equipment is playing right now in the building of new plants, airports, army camps, roads and other vital war-time facilities.

Do you wonder that we say that *good* wire rope is indispensable for the success of our war program.

In American Tiger Brand Wire Rope we offer you the quality of rope you *must* have if you expect to meet the demands of war-time operation.

To help you get the most out of Tiger Brand Wire Rope we are prepared to help you select the right type of rope that will best suit your equipment and will gladly show you how to make it last under hard, continuous duty. Remember — every wire rope allowed to wear out prematurely is an unnecessary loss to the nation.

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they are able to do an increased amount of work each year with the same budget.

The district, spending about $130,000 per year, maintains 318 miles of oiled roads in adobe, conglomerate and rock. One hundred and nine miles of this total are city streets, some of them 56 feet wide. Much grading is done in the construction of drains, ditches and slopes to carry off rainwater in the rainy season.

After experimenting with secondhand machines, the district recently decided to purchase a new Bucyrus-Erie cable-controlled Bullgrader mounted on an International TD-18 TracTracTor. A Bucyrus-Erie P24 power control winch was also purchased for two main uses: first, to operate the cable-controlled Bullgrader and second, to operate a Wooldridge 13 cubic yard scraper used behind the TD-18 on longer hauls.

Because it is necessary in Kern County for a tractor to travel long distances on maintenance work some concern was felt that the added weight of the Bullgrader would increase wear on the front track idlers. After several months of operation, however, it was found that the addition of a Bullgrader had not appreciably increased the wear on the track idlers. Moreover, it was indicated that the addition of a Bullgrader had resulted in no more wear than if the tractor had been operated an equal period of time without it.

That is neither phenomenal nor unusual. Present day Bullgraders as designed are a far cry from the straight timber or iron dozer of a few years ago. Welded construction and the use of exceptionally strong, wear resisting alloy steels provides maximum strength with minimum weight in the Bucyrus-Erie Bullgrader. The blade is scientifically curved so that the dirt sucks or boils up toward the top of the Bullgrader. Some of the Kern County grading is done in hilly country. Here the balance of the Bullgrader on the tractor shows up to good advantage.

When longer hauls up to 2,000 feet are made, a 13 yard Wooldridge scraper is used behind the TD-18. Two thousand feet is usually the limit of distance in which excavated material is hauled. It is rarely necessary to use trucks and a shovel, or to blast material.

• Kern County's International-mounted Bucyrus-Erie Bullgrader gouges out a heavy cut near Bakersfield, California.

The district includes much of a flat country near Bakersfield and extends into the nearby mountainous sections. Annual budget figures are based on 20% of all revenue apportioned to Kern County as a whole. This includes both gasoline tax and a property tax for roads.

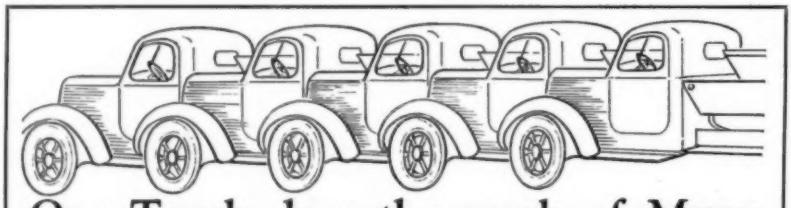
WPB Plans to Inventory Used Construction Equipment

A nationwide inventory of used construction machinery to make it available for war production has been announced by the War Production Board.

The survey will be carried out by the used construction machinery section of the construction machinery branch. H. O. Penn is chief of the section.

A construction machinery specialist will be appointed for each of the WPB regional offices and will be in charge of the inventory in that region. Inventory cards will be mailed to each owner of such equipment for a complete listing. Information sought will be the kind, type, size, condition, manufacturer, serial number, model number, year manufactured, year purchased, type of power, attachments, estimated cost of repairs, sales price (as is) and other pertinent data for each piece of equipment owned.

It is estimated by the branch that there are more than 500,000 pieces of vitally needed construction equipment throughout the country, many of them not now in use, or used but little.



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Tracklaying tractors, cranes, shovels, draglines, pavers, mixers, scrapers, motor graders, pile drivers, compressors, and auxiliary mounted equipment are in urgent demand. Many of these tools in the hands of townships, counties and municipalities are used for only a few days a year and could be kept busy all the time for war construction.

A complete inventory of available equipment will be kept up-to-date at each regional office for the information of the Army, Navy, governmental agencies and private contractors engaged in war work. "Change of status" cards will be provided for machinery owners so they may report movements and uses of their equipment.

Because the productive capacity of construction machinery is in direct ratio to its condition of repair, the section recently has completed a comprehensive survey of repair and service facilities throughout the country.

This survey of 400 established shops shows there are more than two million square feet of shop space available, 3,000 skilled repairmen and some 13 million dollars worth of repair parts in inventory. Each regional office will have a breakdown of this survey to assist in expediting repairs.

The nationwide used construction machinery survey was decided upon, according to Mr. Penn, because of the increasing demand for emergency assistance in this field. Recently, he said, a contractor who had just 30 days to complete runways for an air training base was unable to obtain heavy motor graders. They were found for him just in time.

Heavy cranes, shovels and other equipment also have been located and the demand continues to increase as the output of new construction machinery declines.

Key West Highway Bridges

Reversing an earlier expressed intention not to undertake the projects, Cleary Brothers Construction Co., of West Palm Beach, notified the Florida State Road Department August 5 that it would start work immediately on the construction of 18 bridges on the new Overseas Highway to Key West.

The company's first notice had been answered by the road department with a statement that the state might take over the job itself along with other work of completing the new road to connect Key West with the mainland.

Cleary Brothers obtained a contract in March to build 18 bridges for $882,742, but notified the department on July 27 that it did not intend to start work because priority ratings had not been granted. The road department said a rating of A-1-A had been given the project on May 29.

The Cleary firm previously started work on another bridge, over Jewfish Creek, for which it had a $198,461 contract.

Chairman Thomas A. Johnson announced that the road department still planned to use its own men and equipment to build three remaining bridges and surface 83 miles of highway to complete the Keys project. It was announced further that the state work would start upon the completion of a formal agreement with the Federal Bureau of Public Roads, which is supplying part of the funds.

'41 Cement Summary

Cement manufacture by grinding, burning, and regrinding the raw materials was not developed until 1824, and it was not until about 1900 that the production of portland cement became important as an industry. The cement industry has experienced phenomenal growth since that time and throughout 1941 its activity was accelerated to meet the growing demands for defense construction.

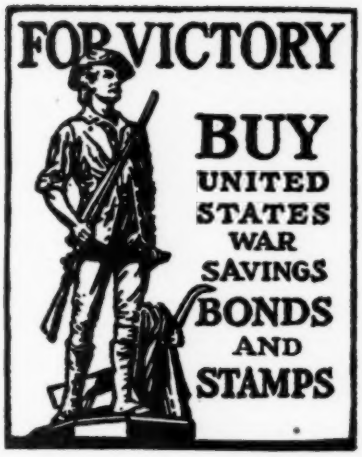
Statistics relating to the portland cement industry in 1941 compiled by the Bureau of Mines, United States Department of the Interior, from the final returns of the producers for the year confirm the preliminary figures published by the bureau early in January, 1942.

Production of portland cement in 1941, 164,030,559 barrels and shipments, 167,439,237 barrels, showed increases of 26 and 28 per cent, respectively, as compared with 1940.

The average factory price per barrel in bulk in 1941 was $1.47, an increase of 1 cent compared with 1940.

Producers' stocks of portland cement at the mills on December 31, 1941, 19,955,979 barrels, were 15 per cent lower than those at the end of 1940.

Figures on per capita consumption, based on mill shipments by producers into states, have been compiled. They show that 82.4 per cent of the mill shipments in 1941 were moved by railroad; 14.8 per cent by truck; 2.7 per



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• The job of grading for the new Hawleyton Turnpike in Broome County, New York, was entrusted to the county's new ¾-yard Lorain shovel.

cent by boat; and 0.1 per cent by pipeline. Thirty-one per cent of the shipments of portland cement was by bulk; 39.6 per cent in paper bags; 29.4 per cent in cloth bags; and less than 0.05 per cent in other containers.

As compiled from monthly estimates of the cement producers, supplemented by a few estimates by the Bureau of Mines, the following quantities of fuel were consumed at portland cement plants of the United States in 1941 compared with production of 164,030,559 barrels of finished cement and 163,629,000 barrels of clinker (unground cement): Coal, 6,831,825 short tons; oil, 3,552,030 barrels (149,185,260 gallons); and natural gas, 54,207,900,833 cubic feet. In addition to the foregoing fuels, two plants reported the use of petroleum coke with other fuels.

The electricity used in the industry in 1941 totaled 3,644,456,171 kwh, of which 52.8 per cent was purchased and 47.2 per cent generated at the portland cement plants.

The commercial capacity for production of finished portland cement of the 155 shipping plants in 1941, and of one plant inactive in 1941 but producing within the 7 previous years was 247,359,000 barrels. No new plants began production in 1941. Total production for 1941 was 66.3 per cent of the indicated capacity at the close of the year; the corresponding figure for 1940 was 51.2 per cent.

Panama Canal Highways Completed Per Schedule

Working night and day, the U. S. Public Roads Administration of the Federal Works Agency has met the Army time schedule for completion of two highways of great importance to defense of the Panama Canal. Early this year Army officials set a date of June 15 for making the Trans-Isthmian Highway available for military use, and July 1 for completion of the Chorrera-Rio Hato Highway, a section of the Inter-American Highway, giving access to important air defenses for the canal.

The job of placing over 50 miles of concrete surface through the hills and jungles of Panama in six months' time was a big one. Distance from supplies of machinery, repair parts and sources of experienced workmen complicated the problem.

Public Roads engineers organized the work for maximum production of all machinery on the two jobs and by the end of January began to feel that they would reach the goal assigned to them. However, their plans were nearly upset by the weather. The "dry season" in Panama extends from December through April, but this year brought the wettest "dry season" in 20 years.

Torrential rains caused many delays in February, March and April.

Major construction work in Panama generally stops with the beginning of the wet season in May. This year work was pushed ahead in spite of the rains (nearly 3 inches in one two hour period) and now both roads are surfaced and ready for military use. Some minor work remains to be done in finishing shoulders and putting the final touches on the job.

The Trans-Isthmian project extends from near Colon to Madden Dam, a distance of 24½ miles. From there an existing road connects with Panama City at the Pacific entrance to the Canal. Grading of the new road was largely completed during the dry season of 1941. The surface just completed consists of two 10-foot lanes designed to carry the heaviest military vehicles at a speed of 60 miles per hour.

Completion of the road adds greatly to the defense of the canal. Motorized forces at one end of the canal are almost immediately available for use at of movement was by railroad or by the other end. Formerly, the only means water through the canal.

The Chorrera-Rio Hato road was projected originally as a section of the Inter-American Highway. Chorrera is 25 miles from Panama City to which it is connected by an existing road. The new road extends 52 miles to the important military airfield at Rio Hato. Construction was begun in cooperation with the Republic of Panama under direction of Public Roads engineers. At the outbreak of the war it became imperative that the road be completed in the shortest possible time. About half of the 52 miles had been surfaced. The

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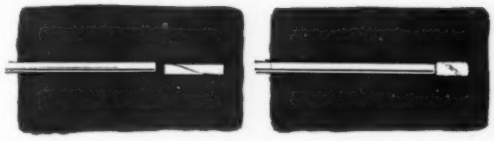

1 The regular-size cartridge goes in the bore hole. Note the space to be filled.

2 Pressure from the tamping rod compresses the powder to fill the space.

3 Another cartridge goes in—Compaction takes place inside the wrapper.

4 The charge is concentrated for better blasting results.

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• One of Blackwell Engineering construction company's ¾-yard Erie shovels grades a building subdivision road in Arlington County, Virginia.

United States agreed to complete the work without cost to Panama; all available machinery was concentrated on the job, and surfacing was completed on July 1.

The two projects involved 76 miles of concrete pavement, 42 bridges and exceptionally heavy grading.

Work is now under way on a new road to replace the existing road between Madden Dam and Panama City.

Subdivision Excavation Job

By Spencer Jones

Housing all the people that have been called to Washington, D. C., these days to play their part in Uncle Sam's war effort has become a problem of major importance.

Buyers of homes, before the recent building restrictions, were forced to cross the Potomac River, in nearby Virginia, where alert subdividers and builders welcomed them with open arms. Here, closer to downtown Washington than many reasonably priced residential sections north of the river, are several attractive towns, most of them included in the thirty square miles of the original District of Columbia that were ceded back to the State of Virginia in 1846.

Active in the grading of these "close-in" subdivisions was the Blackwell Engineering Construction Company, of Warrenton, Virginia, A few years ago R. Conway Smith, superintendent for the Blackwell Engineering Construction Company, was sent from Warrenton to this subdivision section to supervise a little job consisting of some grading, most of which was done with a 20-B Bucyrus-Erie ¾-yard shovel. With James Harlow as his foreman, Smith did the work so well and so promptly that another subdivider asked them to do his grading.

One job led to another and kept the Blackwell organization busy so steadily that both Smith and Harlow have settled permanently in one of these Virginia subdivisions. The greater part of their work has been in Arlington, a nebulous area in that it includes an incredibly large number of small towns.

Among the subdivisions graded by the Blackwell organization were Redfern Gardens, Lacy Forest and several which were sold out so fast the subdividers never got around to naming them. One such as yet un-named subdivision was near Falls Church, so-called because of the nearby church of which George Washington was a vestryman, and where the northern troops stabled their horses from 1862 to 1865, which local Virginians find it difficult to forgive or forget.

Close to this historic old church the author found another Blackwell 20-B Bucyrus-Erie, rigged as a dragshovel with a ¾-yard dipper, being hauled on a Trailmobile to the anonymous subdivision to do a job of ditch digging. For the grading work of the Blackwell organization also takes in ditches, trenches, roads, streets, cellars, building sites and any other work that requires moving earth from one place to another.

The chief activity of the Blackwell Engineering Construction Company, however, is roadbuilding, one of its most recent jobs being the construction of several miles of U. S. Route 50 between Boyce and Winchester, Virginia.

NSC Appoints New Director

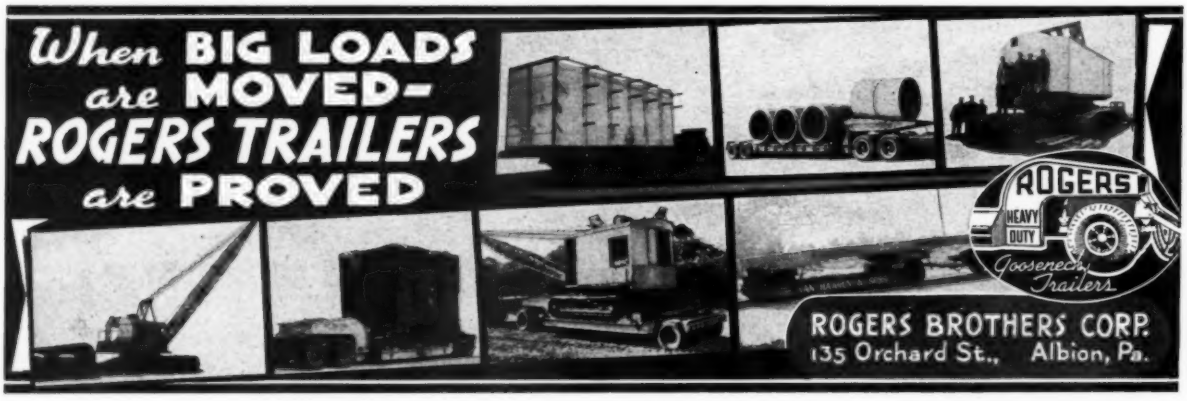
Ned H. Dearborn, of New York City, has been named executive vice-president and managing director of the National Safety Council.

He succeeds W. H. Cameron, who is retiring after almost 30 years as managing director of the council.

Mr. Dearborn's appointment was announced by Col. John Stilwell, president of the council, following a meeting of the executive committee.

Since 1934, Mr. Dearborn has been dean of the division of general education of New York University, a post he now leaves.

In his new position he will actively direct the greatly expanded wartime program now being conducted by the



For your convenience in writing to Rogers Brothers Corporation, you will find a card bound in this issue.

• Power to operate paving breakers and backfill tampers on a street repair job in Los Angeles is provided by the Pacific Electric Company's International - mounted Schramm compressor.

National Safety Council as a result of a proclamation by President Roosevelt.

Necessary funds for this enlarged program, aimed at stopping accidents that are impeding production and delaying victory, now are being obtained from commerce and industry by the council's war production fund to conserve manpower.

An initial appropriation of $250,000 from this fund will be made available to the council for immediate development of this wartime safety program, Colonel Stilwell said. An additional $1,000,000 already pledged, will be allocated within the next few months. A goal of $5,000,000 has been set to meet the minimum needs of the expanded program.

More Explosive Instructions

Rigid instructions regarding the storage, handling and transportation of explosives by the more than 145,000 persons licensed under the Federal Explosives Act have been issued for the two-fold purpose of preventing sabotage through use of explosives, and preventing disasters involving explosives, particularly in coal and metal mines and quarries, on construction jobs, and on other projects participating in the war program.

Anyone violating the instructions may have his federal license revoked, be refused a renewal of his license or may be prosecuted under the act and thus be subject to a fine of not more than $5,000 or imprisonment for not more than one year or both fine and imprisonment.

The new instructions provide among other things that explosives must be stored in "substantially-constructed and securely-locked buildings or in suitable containers" and that they must be protected at all times against theft, loss or unauthorized use. Specific instructions also are given for construction or various types of explosives-storage magazines.

In exercising strict control over non-military explosives and their ingredients, the Bureau of Mines has scores of its authorized representatives in the field to see that the act and the regulations and instructions issued under the act are obeyed. The authorized representatives of the bureau include explosives investigators of the explosives control division, federal coal mine inspectors, inspectors of the recently-created mineral production security division and members of the bureau's safety division.

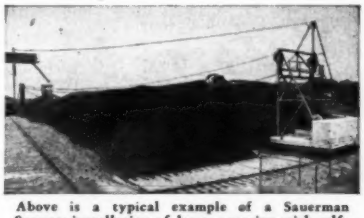
Although federal explosives licenses are not issued to persons or firms believed disloyal or hostile to the United States or those believed incompetent or unreliable, Dr. R. R. Sayers, director of the bureau of mines, explained that the bureau also must maintain close surveillance over explosives issued to licensed persons so sabotage and accidents will be curbed.

Every person licensed to manufacture or store explosives will be required to identify clearly the place where the plant or magazine is located by posting signs reading "Explosives—Keep Off."

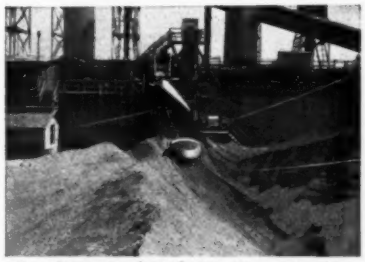
One section of the instructions is devoted to requirements for surface storage magazines. This applies largely to the some 16,000 coal mines, the 7,000 important metal mines and the 2,000 larger quarries in the nation, which use large amounts of blasting materials.

General requirements are that storage magazines must be locked securely at all times, except when an attendant is on duty. Likewise, suitable barricades, fences, floodlights and other protective means are to be used when the bureau or its authorized representatives

Bulk Storage Simplified



Above is a typical example of a Sauerman Scraper installation of large capacity with self-propelled tail tower as used at mines and processing plants for open storage of materials. This type of machine is able to cover a wide storage area and handle a large tonnage both storing and reclaiming.



At a large phosphate drying plant in Florida, wet rock is stored on the ground by a Sauerman Scraper and then after draining is reclaimed to the plant by the same scraper. An average day's handling is 600 tons.

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SAUERMAN SCRAPER

At pits, quarries, mines and processing plants, Sauerman Power Scrapers are being used most effectively in the stock-piling of materials, either in the open or inside buildings.

One of the great advantages of this equipment is its flexibility, which permits Sauerman engineers to adapt each scraper installation to the exact needs of the job.

Moreover, the first cost of a Sauerman installation is reasonable, maintenance amounts to very little, and the simplicity of operation makes it possible to place the control of even the largest installation in the hands of one operator.

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OUTPUT floats in a BATH OF OIL

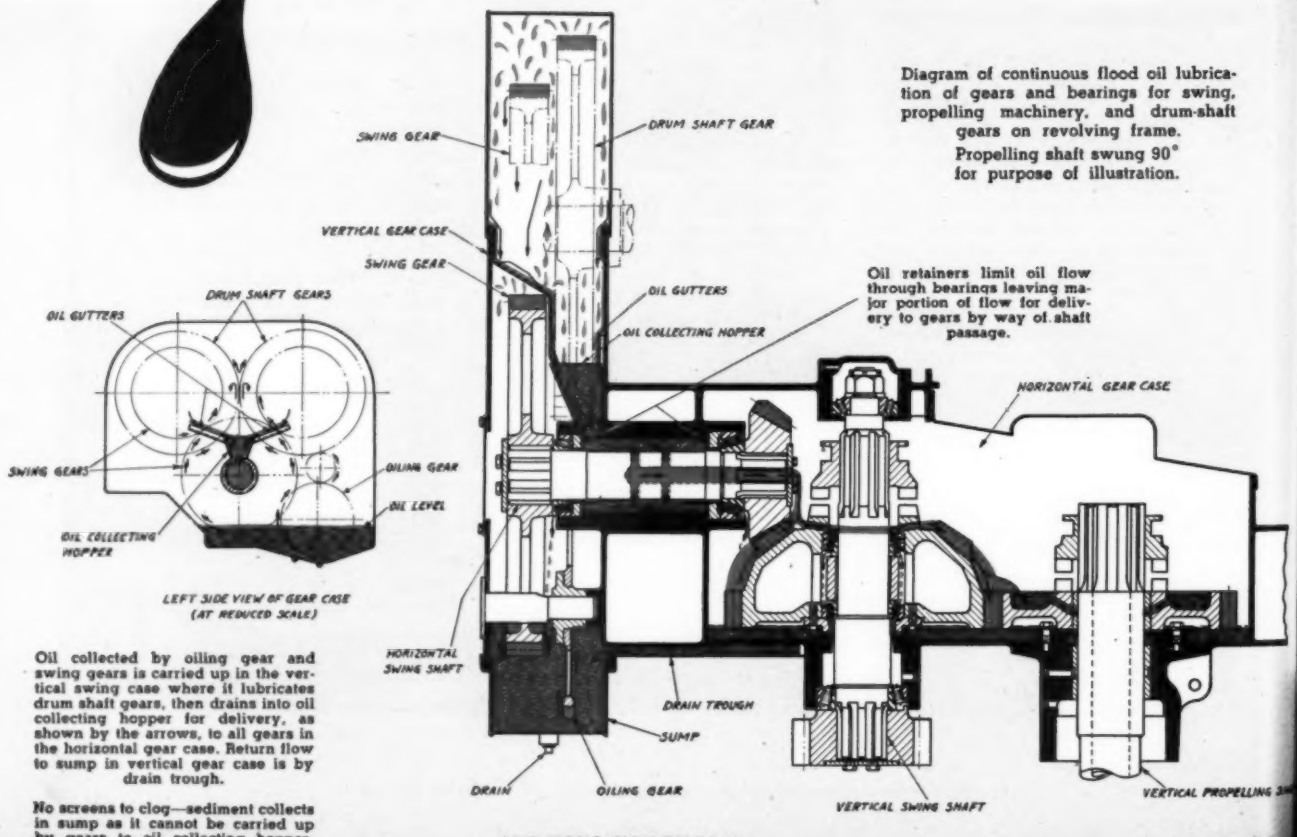

Diagram of continuous flood oil lubrication of gears and bearings for swing, propelling machinery, and drum-shaft gears on revolving frame.
Propelling shaft swung 90° for purpose of illustration.

Oil retainers limit oil flow through bearings leaving major portion of flow for delivery to gears by way of shaft passage.

LEFT SIDE VIEW OF GEAR CASE (AT REDUCED SCALE)

Oil collected by oiling gear and swing gears is carried up in the vertical swing case where it lubricates drum shaft gears, then drains into oil collecting hopper for delivery, as shown by the arrows, to all gears in the horizontal gear case. Return flow to sump in vertical gear case is by drain trough.

No screens to clog—sediment collects in sump as it cannot be carried up by gears to oil collecting hopper.

15-B LUBRICATION DIAGRAM

IN 3/8-, 1/2- and 3/4-yard Bucyrus-Eries, every gear except swing pinion and rack is enclosed and operates in oil. That's one big reason you can count on Bucyrus-Eries for big output and for the high-speed 3-shift operation so necessary in wartime. Power transmission is cool, smooth and efficient through Bucyrus-Erie oil baths, and your operator doesn't have to take valuable digging time to lubricate gears.

Study the details of any machine in the complete Bucyrus-Erie line, and you'll see a lot of reasons why they have always been chosen for the heavy digging, why they are especially in demand for today's vital work.

LOOK FOR THESE OUTPUT-SWELLING, MAINTENANCE-CUTTING FEATURES:

1. Oil-enclosed gears
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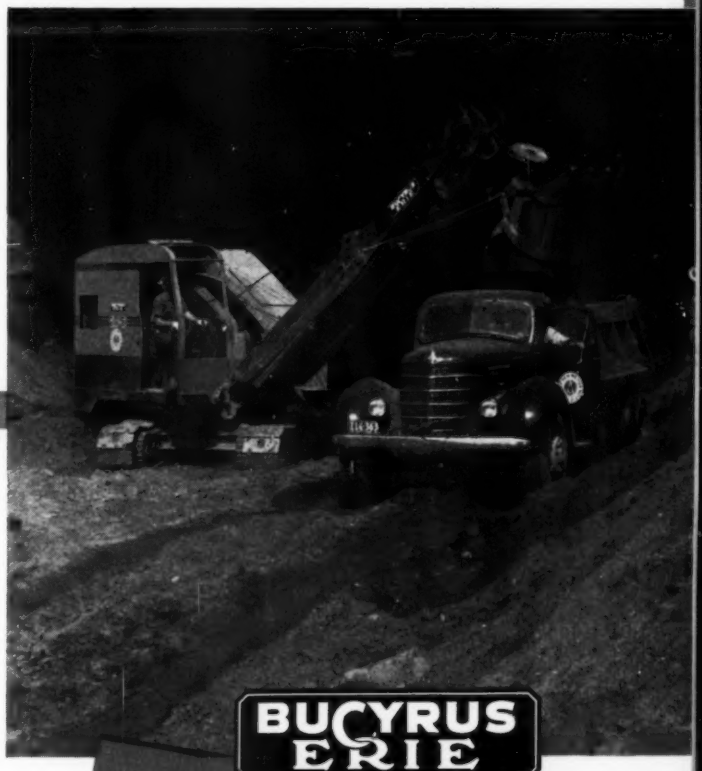
4. Ample power especially adapted to excavating work
5. Full mobility with complete steering control
6. High efficiency with any type front end



BUCYRUS ERIE

Two of every 3 Bucyrus-Eries sold are repeat orders — good evidence that these, and other Bucyrus-Erie features "pay off" in actual operation.

Bucyrus-Erie

SOUTH MILWAUKEE, WISCONSIN

so advise. Distances at which explosives-storage magazines should be located from highways, railroads and inhabited structures also are set forth in the instructions. Explosives and detonators must be stored separately.

For the thousands of farmers, operators of smaller mines and contractors who have explosives on hand in amounts of 50 pounds or less, the box-type magazine may be used.

Other instructions concern requirements for construction and location of magazines for storage of more than 50 pounds of explosives, but less than 2,000 pounds, and for storage of explosives exceeding 2,000 pounds.

1941 Explosives Figures

A large increase was recorded in the quantity of explosives used in the United States for mining, quarrying, road-construction and other industrial purposes in 1941. Reports to the Bureau of Mines, United States Department of the Interior, from manufacturing companies showed an increase of nearly 14 per cent over 1940 in the total quantity of explosives used, which reached 482 million pounds in 1941. This figure relates to non-military explosives only and it also does not include imports or exports of industrial explosives nor does it cover ammunition or fireworks.

Of the total quantity of explosives used, 59 million pounds were black blasting powder, 71 million pounds were permissible explosives, and 352 million pounds were high explosives other than permissibles. Virtually all of the permissible explosives, which form a class designed especially for use in coal mines with a view to promoting safety, were used in coal-mining operations. Coal mines also used about 90 per cent of the black powder consumed in 1941. High explosives other than permissibles were distributed about 66 per cent to mines and quarries, 31 per cent to construction operations of various kinds, including dam-building, tunneling, and road-building, and about 3 per cent was used for all other purposes.

Coal mines used 24 million more pounds of explosives in 1941 than in 1940. An increase of 19 million pounds was reported for stone quarries and nonmetallic-mineral mines. Metal mines increased consumption by 10 million pounds. An increase of 6 million pounds was required for construction work.

Large increases in consumption of explosives were reported for all of the principal coal-mining states. Aside from coal mining, the consumption of high explosives other than permissibles increased notably in quarrying or mining of metals or nonmetals other than coal in Illinois, Ohio, Indiana, and Missouri, and the same class of explosives also increased by large quantities for construction work in North Carolina, Tennessee, and Ohio.

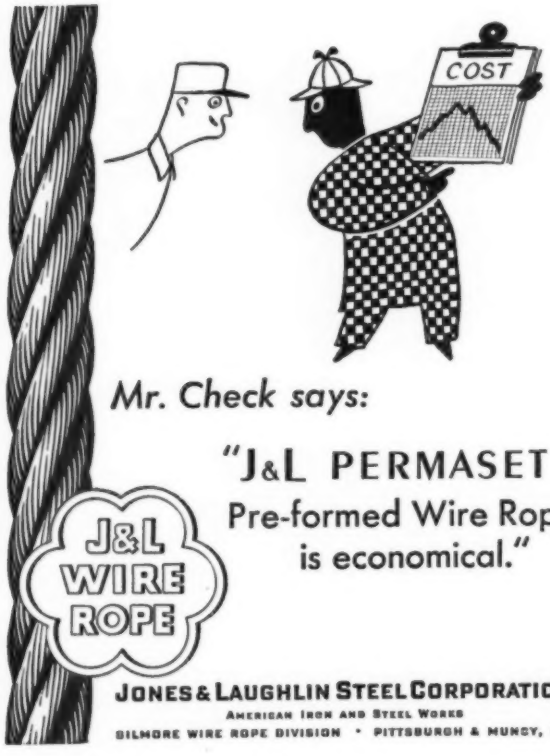
Kentucky Dam Completion Advanced One Year

Tennessee Valley Authority workmen are rushing construction of the huge Kentucky Dam (see Excavating Engineer, February, 1941), on the Tennessee River at Gilbertsville, Ky., the completion date for which already has been advanced one year, with closure of the dam and first storage of water now being scheduled for December, 1943.

Early in August workmen were driving steel piling for the final cofferdam. Pouring of concrete for the navigation lock and powerhouse was virtually complete, and nine bays of the spillway were ready for diversion of the river.

The project's total cost will be $107,500,000. The dam will be more than 8,600 feet long, and will rise 166 feet above the bed of the river. Its 184-mile lake, with an 1,800-mile shoreline, will provide a huge capacity for flood storage. The reservoir will extend into Tennessee.

It is estimated that the reservoir, which is the principal project in the Tennessee River system for control of Tennessee River floods for the benefit of conditions along the Mississippi River, ordinarily will be able to reduce major Mississippi flood peaks at Cairo by approximately two feet.



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Kaolin Production

For three straight years production of a high-grade clay in the United States has made new records. In 1941, sales of domestic kaolin or china clay jumped to 1,087,848 short tons valued at $9,205,892 compared with 833,450 tons valued at $6,994,106 in 1940, according to the Bureau of Mines, United States Department of the Interior. The tonnage topped that of the previous year by 31 percent and was more than double that of 1929. The paper industry alone required 110,000 tons more than in 1940 and consumed 56 percent of the total shipments. The country needs more and more paper, larger proportions of clay are used in making high-grade paper, and domestic clay is being used instead of imported clay both as filler and coating. Percentagewise, the consumption of clay for refractories, pottery, rubber, paint and certain minor uses increased even more than shipments of paper clay.

Imports, almost all English clay which is used chiefly in paper, sanitary ware, and pottery, and to a diminishing extent in porcelain and tile, amounted to only 66,935 short tons with a foreign market of $698,502 for the first 9 months of 1941. Import statistics for the last quarter cannot be published but the total for 1941 was undoubtedly less than the 105,566 tons imported in 1940. Average figures for 1925-29 show imports of 339,014 tons and domestic shipments of only 453,618 tons a year and during the period 1909-13 the ratio of imports to domestic shipments was nearly 2 to 1 (261,266 and 132,114 tons a year, respectively).

In 1941, as usual, Georgia was the leading kaolin mining state, producing 787,013 tons or 72% of the national total output. South Carolina, with 177,276 tons or 16% of the total, ranked second, and Pennsylvania, with 44,277 tons or 4%, third. Other producing states were, in order of output, Florida, California, North Carolina, Virginia, Delaware, Illinois, Alabama, Maryland, Vermont, Utah, and Tennessee.

Start Construction on Atlantic Coast Waterway Link

Start of construction on another link in the Atlantic Coast waterway, a three and a half mile canal across the southern tip of New Jersey's Cape May, was announced August 7 in Philadelphia by Army engineers, who said completion was tentatively scheduled for November 1.

Linking North Cape May, on Delaware Bay, and Cool Spring inlet from the Atlantic, the canal will eliminate the dangerous open sea voyage around the cape. A 12-foot channel will be dug by two dredges. It was announced that total cost of the project, including construction of three sling-type bridges, one of them carrying a railroad, will be slightly more than $1,000,000.

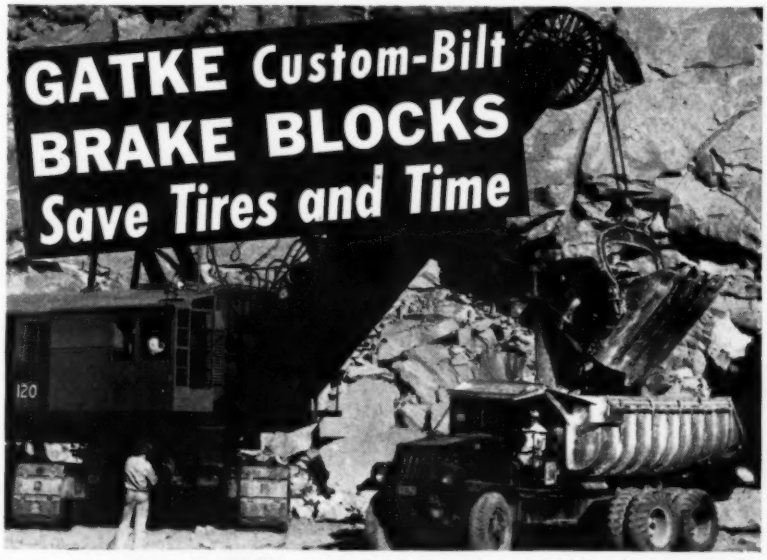
Dodge Construction Report

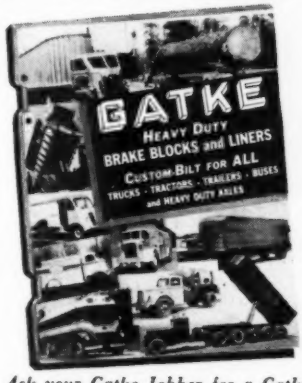
Record-breaking construction volume continued through July, according to F. W. Dodge Corporation.

Building and engineering contracts awarded during this month in the 37 eastern states amounted to $943,796,000; while this was 21 per cent under the all-time high of June, 1942, it was far larger than any other contract total ever recorded. Compared with the figure for July of last year, $577,392,000, there was an increase of 63 per cent.

Ninety-three per cent of the large July, 1942 total was for publicly owned projects, indicating the extent to which war construction has blacked out private work. Industrial building contracts were nearly three times as large as in July, 1941; heavy engineering contracts more than doubled the July, 1941 figures; residential building contracts ran 38 per cent behind the corresponding month of last year.

The cumulative total of construction contracts for the first seven months of this year has amounted to $4,667,521,000, compared with $3,127,354,000 in the corresponding period of 1941, an increase of 49 per cent. This year's 7-month contract total is the largest ever recorded for the first seven months of any year.





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Victory Road

(Continued from page 449)

ribbons of concrete. That something was steel reinforcing, since war and priorities even affect Victory highways.

Two provisions were made to make up for the lack of steel. The pavement is 9 inches thick, and a new type of concrete was introduced to minimize cracking and scaling. The $140,000 paving contract awarded to the Kramp organization called for 1.09 miles of pavement, 54 feet wide.

A batching plant was set up on a Northwestern Railroad spur track on the south limits of Cudahy and about 200 feet from the road to be paved. Sand and gravel were hauled by trucks to this location and loaded to a Butler bin by a Northwest 105 clamshell crane. The Butler unit with a double hopper, dropped a fixed amount of aggregate to six Ford rear dump trucks and one General Motors rear dump. Then, these trucks backed into a shallow pit next to a platform built to box car floor level and took on the correct amount of cement from a 13,000 barrel supply which was brought in by rail from Manitowoc. From here the trucks hauled the prepared dry batch direct to a Koehring paver.

The new-type cement was put to its first practical use on this job. The Manitowoc Portland Cement Company, manufacturers, label it Vinsol Resinol. City Engineer Vic Heim is well pleased with the results.

The pavement was laid down in four sections in Blaw-Knox forms. The seven-foot outside lanes and curbs were put in first. Each of the twenty-foot center sections were keyed to the adjoining outer strip.

Two shovels, a Lorain and a Koehring, dug out the old concrete and formed the grade. An Allis-Chalmers Type K tractor equipped with a bulldozer levelled it and a Wehr roller finished it. Concrete was mixed and placed by the crawler-mounted Koehring paver and surfaced by a Lakewood finisher and a Flex-plane.

On August 15, Cudahy's citizenry turned out for an elaborate celebration. Governor Heil gave the dedicatory speech. South Milwaukee sent its mayor and smartly clad band to march in the parade. There was a pavement dance, and much elbow bending in Cudahy's taverns for those who preferred to discuss the birth of Victory highways.

• Two pneumatic paving breakers break up the concrete above the new sewer trench excavation site, getting it ready for the clamshell to load out.

• Nick (left) and Andrew Tomaro, president of Tomaro Contractors, Inc., actively supervised their Packard Avenue contract.

THE LITTLE RED GOD

Here's a song to the Little Red God of Guts,
Who dwells in palaces, brothels, huts;
The Little Red God with the craw of grit;
The God who never learned how to quit;

He is neither a fool with a frozen smile,
Or a sad old toad in a cache of bile;
He can dance with a shoe-nail in his heel
And never a sign of his pain reveal;

He can hold a mob with an empty gun
And turn a tragedy into fun;
Kill a man in a flash, a breath,
Or snatch a friend from the jaws of death;

Swallow the pill of assured defeat
And plan attack in his slow retreat;
Spin the wheel till the numbers dance,
And bite his thumb at the God of Chance;

Drink straight water with whiskey soaks,
Or call for liquor with temperance folks;
Tearless stand at the graven stone,
Yet weep in the silence of night, alone;

Worship a sweet, white virgin's glove,
Or teach a courtesan how to love;
Dare the dullness of fireside bliss,
Or stake his soul for a wanton's kiss;

Blind his mind to a woman's eyes
When she says she loves and he knows she lies;
Shovel dung in the city mart
To earn a crust for his chosen art;

Build where the builders all have failed,
And sail the seas that no man has sailed;
Run a tunnel or dam a stream,
Or damn the men who financed the dream;

Tell a pal what his work is worth,
Though he lose his last, best friend on earth;
Lend the critical monkey-elf
A razor, hoping he'll kill himself;

Wear the garments he likes to wear,
Never dreaming that people stare;
Go to church if his conscience wills,
Or find his own—in the far, blue hills.

He is kind and gentle, or harsh and gruff;
He is tender as love—or he's rawhide tough;
A rough-neck rider in spurs and chaps,
Or well-groomed son of the town, perhaps;

And of this Little Red God I sing,
Who cares not a wallop for anything
That walks or gallops, that crawls or struts,
No matter how clothed—IF IT HASN'T GUTS!

VITAMINS IN CONCRETE AND STEEL

• VITAMINS for public morale! Vitamins for investment morale! Vitamins for America's defense and growth!

The most important single producer of these vitamins is the Construction Industry.

Construction is all of us. It is a family planning its new home. It is a bank making a loan. It is a plumber installing a bathtub. It is a steel worker battering a rivet head. It is an artist designing a wall paper.

Construction is still a community effort, working in its birthplace, improving its birthright. Construction is local in its bigness. National only in its forthright American character.

There is no man, woman or child or business whose daily life is unaffected by Construction. More money finds its way into completed Construction than all other forms of investment combined.

Without benefit of ballyhoo, Construction is hammering out its gigantic emergency defense job of two and a half billion dollars. And without pausing in stride its leaders are carrying forward America's permanent line of defense—home-building.

The miracles of Construction are legion. Time may march in measured tread but Construction whips it through a century in six weeks. Rushing rivers require eons to cut through a mountain range. Construction needles the solid rock and pushes its rivers through.

Construction is more than a brilliant way of overcoming the obstacles of nature. It is the mighty tide of America. Initiative, freedom, opportunity—these are the real vitamins of Construction and of all American industry. They provide the driving force for the individual to go ahead—achieving for himself and at the same time contributing to the welfare of his neighbors.

Construction is a many-sided industry. It has a direct relation to your community no matter how big or how small or where located. For an illustrated, high-lighted story of the whole industry, see the 32-page supplement now appearing in Nation's Business. If you are not a subscriber, send 10 cents for reprint of "The Case for Construction." Or better still, send 25 cents for a full copy of the April issue.

WHAT HELPS BUSINESS HELPS YOU

★

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NATION'S BUSINESS

It is the 50th of a series contributed toward a better understanding of the American system of free enterprise.

Aggregate On Order

(Continued from page 452)

these limits is bunkered, and the plus 2½-inch rejects go to a surge bunker and thence to the Newhouse secondary crusher. Product of the crusher, of course, circuits back onto the top screen again.

The company has found that their production of 1½ to 2½-inch rock often exceeds demand, and to manufacture all that comes off the second set of screens would mean maintaining an excess stockpile. Hence, they have arranged the plant so that, when their supply of this grading is high, they can transfer this material to the secondary crusher.

Sand Production

Minus ½-inch material from the first set of screens is used to make sand. The company's demand is for about half and half sand and rock, but the local material runs only about 35 per cent sand and the balance rock. Hence the sand production set-up is unusually complete.

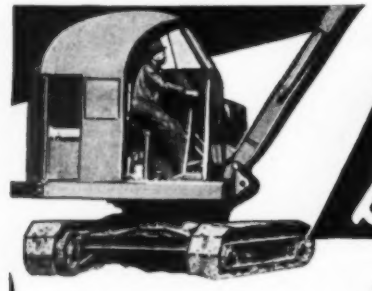
The minus ½-inch rock passes onto an A-C double deck, 4x12 screen, with the top screen scalping off 5/16 to ½-inch, and the second, ⅛ to 5/16-inch. Both these products are bunkered. The bottom screen has three four-foot sections. The first section passes the fine sand and the next two, coarse sand. These products are transferred to two Wemco screw sand classifiers.

To make up for the shortage of sand, rejects from the ⅛ to 5/16-inch screen may be passed into an eight-yard surge hopper, from which point they are dropped into a Symonds impact crusher. Material from this crusher goes to an A-C 4x14, 4½-mesh screen, and sand which passes this goes to the classifier. Rejects are close-circuited back again through the impact crusher.

In a typical week, Plant Superintendent Silva will receive several orders for concrete mix. So the plant is laid out to supply batched quantities without delay. An underground conveyor operates in a concrete tunnel underneath the eight storage bunkers. The proper volume of each aggregate classification is measured out through manually controlled gates onto the conveyor, and taken up an incline to the track unloading chute. Arriving at the top of the unloading structure, the mix is passed through an oscillating chute to the gondolas on the track below. This oscillating feature prevents segregation of the mix.

Straight gravel orders, on arriving at the top of the unloading structure, are given another washing. The rock is sent through a rotating scrubber and dewatering screens, and then is transferred to the railroad cars.

Every hour, 225 tons of aggregates travel up the inclined conveyor to the loading trestle. One by one, each gondola in a long train of cars is filled. Then the switching locomotive gets busy, routes the train to the main lead, and the regular Southern Pacific locomotive takes over the job of transporting the finished product wherever Uncle Sam needs it.



WELDED
ROLLED STEEL CONSTRUCTION
for GREATER STRENGTH and SPEED
BULLDOG GRIP

● There is tremendous closing power in Williams Buckets. That's why they bite so deeply and cleanly in hardpan digging, or work so proficiently in clearing rubble, lifting rocks or slabs of concrete.

Williams Buckets are "built to last and move dirt fast". All-welded construction at vital points imparts greater strength while eliminating excess weight; only riveted at sections which may ultimately require replacement. Another important exclusive feature of the Williams bucket, illustrated in action, is straight line reeving that reduces wear and prolongs cable life.

Many definite reasons why your next bucket should be a Williams are found in the individual bulletins completely describing each type of Williams Bucket. Sent free on request.

THE WELLMAN ENGINEERING CO. • 7002 Central Ave., Cleveland, Ohio
Distributors in all parts of the country

WILLIAMS *Buckets*
built by WELLMAN

For your convenience in writing to The Wellman Engineering Co., you will find a card bound in this issue.

Save costly tool-changing TIME...cut accidents
Costly tool changing time is changed into productive drilling time by the modern safety-first built-in tool wrenches now available on all Bucyrus-Erie blast hole drills.
The modern built-in tool wrench and safety-first operating platform eliminates the back-breaking labor of handling heavy tool wrenches. On most jobs they cut the time for tool changing in half. They give your workmen a safe, dry platform to work on that eliminates a lot of the danger of broken legs and smashed toes. They make it easier for men to work fast.
These tool wrenches are available on all Bucyrus-Erie blast hole drills. Write for further information.
Bucyrus·Erie
SOUTH MILWAUKEE, WISCONSIN

For your convenience in writing to Bucyrus-Erie Co., you will find a card bound in this issue.

New trade literature

Title: **"OEM Handbook"**

Subject: The 72-page booklet describes in detail the organization of the War Production Board, the Office of Price Administration and other agencies of the Office for Emergency Management. Personnel is listed in most cases down to the branch level in each agency. Included are organization charts of the WPB and the Bureau of Industry Branches of the WPB of Industry Operations, as well as a chart showing the relationship of the various federal war agencies.

Where to Get: Room 1501, New Social Security Building or from the Superintendent of Documents, Washington, D. C. Free upon request.

Title: **"Koehring Trail-Dump"**

Subject: The catalog has 50 illustrations with 16 pages in color. It presents the Model 120 as a complete unit with individual assembly illustrations depicting the operating functions and many special features.

Where to Get: Koehring Company, 3026 W. Concordia Avenue, Milwaukee, Wisconsin. Ask for bulletin K-179.

Title: **"Heavy Duty"**

Subject: This catalog covers brake blocks and liners for trucks, tractors, trailers and other heavy duty equipment. For quick reference the part numbers of the brake block sets are alphabetically listed by make, year and model. In addition, special recommendations give specifications of liners required for each shoe, with suggestions for meeting emergency requirements.

Where to Get: Gatke Corporation, 228 N. LaSalle St., Chicago, Illinois. Free upon request.

Title: **"How Worthington Serves Industry"**

Subject: A handsome folio containing many illustrations of industrial applications of Worthington Pumps and Machinery.

Where to Get: Worthington Pump and Machinery Corporation, Harrison, New Jersey.

Title: **"Catalog 18—Stock Items"**

Subject: A new up-to-date 16-page catalog listing over a thousand stock items in rheostats, resisters, tap switches, chokes and attenuators. Designed as a quick reference specification or buying guide, catalog 18 will be useful to engineers and purchasing departments. It gives illustrations, descriptions, ratings, prices and other helpful information on the wide range of Ohmite stock types and sizes.

Where to Get: Ohmite Manufacturing Company, Department 8G, 4835 Flournoy Street, Chicago, Illinois. Free upon request.

Title: **"Structural Design of Flexible Pipe Culverts"**

Subject: The results of an investigation conducted by the Iowa Engineering Experiment Station in cooperation with the U. S. Public Roads Administration. The book provides knowledge concerning the structural behavior of the flexible types of culvert pipe. Analysis of experimental evidence and a description of results, contain much valuable information. Charts, graphs, tables and photographs illustrate the bulletin.

Where to Get: Director, Iowa Engineering Experiment Station, Ames, Iowa. Free upon request.

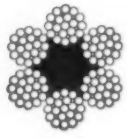
Title: **"Buda News"**

Subject: A tabloid type trade paper devoted to news of Buda equipment and its application. Large, clear, interesting photographs are plentiful.

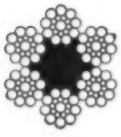
Where to Get: The Buda Company, Harvey, Illinois.

Title: **"Weld Inspection Chart"**

Subject: An arc welding inspection chart, which will provide welding inspectors and others concerned with weld production a simple and extremely helpful aid for use in inspect-



6 x 19
Filler Wire



6 x19
Seale

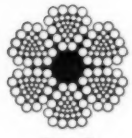
6 x 37
Extra Flexible

And it is the same with wire rope.

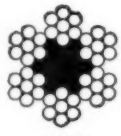
As wire rope is used for many purposes, it is made in a wide range of grades, constructions and types. To obtain maximum results it is necessary to select the rope most suitable for the particular work it is to do . . . the one that can win under the existing conditions.

When the "right rope" is not used, you are losing both time and money because replacements will have to be made more often; and what is *more* to the point—steel urgently needed for ships and shells is being wasted.

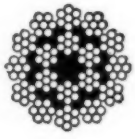
The accompanying illustrations show a few of the many wire rope constructions that are available. These can be furnished in different grades—either Preformed or Non-Preformed. They can also be supplied with either a hemp core, or a wire center of the type best suited for the job. Our experienced Engineering Department is at the service of all wire rope users to help make the proper selection. Feel free to consult us.



Style G
Flattened Strand



6 x 7
Haulage Rope



18 x 7
Non-Rotating

A. LESCHEN & SONS ROPE CO.
WIRE ROPE MAKERS — ESTABLISHED 1857
5909 KENNERLY AVENUE — ST. LOUIS, MISSOURI, U. S. A.

NEW YORK • • • 90 West Street
CHICAGO • • 810 W. Washington Blvd.
DENVER • • • 1554 Wazee Street
SAN FRANCISCO • • 520 Fourth Street
PORTLAND • • 914 N. W. 14th Avenue
SEATTLE • • 3410 First Avenue South

HERCULES WIRE ROPE

For your convenience in writing to A. Leschen & Sons Rope Co., you will find a card bound in this issue.

ing welds. The chart presents the different types of welds obtained when the work is done normally, with normal current, etc., as compared with those obtained when these factors are not normal. These conditions are illustrated by detailed photographs on the chart.

Where to Get: Lincoln Electric Company, Cleveland, Ohio. Free upon request.

Title: **"Revised Asphalt Construction Specifications"**

Subject: Revision of these 20 booklets was made to incorporate present U. S. Bureau of Standards Simplified Practice relating to the gradation of aggregates; the most recently developed equipment essentials; and the latest Asphalt Institute recommendations, based upon a correlation of its laboratory studies and field engineering experience.

Where to Get: The Asphalt Institute, 801 Second Avenue, New York City. Free upon request.

Title **"How Jackbits Reduce Rock Drilling Costs"**

Subject: A two-color 24-page bulletin containing more than 50 illustrations and a table showing the types of jackbits recommended for different kinds of work and various cost data.

Where to Get: Ingersoll-Rand Company, 11 Broadway, New York City. Free upon request.

Notes from the manufacturers

The Marmon-Herrington Company, Inc., Indianapolis, Indiana, announces that A. W. Herrington, president of the Society of Automotive Engineers, technical advisor to Col. Louis A. Johnson on the recent American economic mission to India, and president of the Marmon-Herrington Company of Indianapolis, Indiana, has been elected to serve for three years as a director of the American Society of Military Engineers. The company also announces that Bert Dingley, former executive vice president has been elected and that Mr. Herrington will continue as active chairman of the board of directors.

The B. F. Goodrich Company, Akron, Ohio, announces the formation of the tire conservation department to help conserve rubber and render tire consultant service to truck-fleet operations. John T. Staker has been made manager of the new department.

The Buda Company, Harvey, Illinois, announces the appointment of Wm. T. Sanford as service manager of the railroad division. Mr. Sanford has had wide experience in engineering and field service, having spent 2½ years with the Chrysler Corporation as automotive and diesel field engineer and has also been employed in similar capacities with other large firms.

Mack Truck, Inc., Long Island City, New York, is offering free buttons to drivers and mechanics who sign the pledge of the U. S. Truck Conservation Corps. Copies of the pledge can be secured from any Mack branch and the company will furnish a button identifying the pledgee as a member of the corps.

A. Leschen & Sons Rope Company, are saddened by the death of Harry J. Leschen, president of the firm, who passed away August 2.

Cummins Engine Company, Columbus, Indiana, announces that their regional offices at Fort Worth, Texas have been enlarged. Formerly located in the Mid-Continent Building, the company has taken larger quarters at 1812 Fair Building. J. B. Chambers is regional manager.

The Asphalt Institute, New York City, announces with regret that Burton L. Boye, president of the institute from 1933-1938, and formerly in charge of the asphalt department of the Standard Oil Company of New York, died at Summit, N. J., July 9.

TO ADVERTISE: All advertising in this section is payable in advance. Rate: 60c per line, or $7.20 per inch of 12 lines. Minimum charge $2.40. No discounts; no commissions. If no change in copy is desired, three continuous insertions are offered for the price of two. Read these instructions carefully. Each line contains 41 characters (34 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Count your own copy to save delay. Be sure to enclose the correct amount of money with your order. Closing date—15th of preceding month. Example: January issue closes December 15th.

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

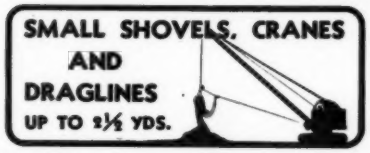
BUCYRUS-MONIGHAN 4-W Diesel Dragline. 110' Boom. 4½-yd. Bucket. Reported good working condition. Some extra parts included. Located Georgia. Box 2796

BARGAIN

30-B BUCYRUS both shovel and dragline booms, Atlas Imperial Heavy Duty Diesel Motor, Electric light plant, two dragline buckets. Located on Canadian National Railway near Edmonton. P. O. Box 231, Edmonton, Alberta, Canada.

FOR SALE

MARION MODEL 125 electric shovel, crawler mounted. 55' boom, 36' handle. 2½-yard bucket. For power supply 3 phase. 60 cycle. 2300 volts. Box 2854



WANTED

P&H 1-YD. shovel, model 450, serial 4399, excellent condition, immediate delivery. Clifford Waterhouse, Jackson, Miss. Tel. 2-0617.

PRICED TO SELL

P&H MODEL 206 ¾ yd. dragline and crane without bucket, 45-ft. boom. Waukesha motor, completely overhauled. Balance of machine in working condition. Box 2898

FOR SALE: two "60" Tractors @ $1,000.00 each. Three Athey Trac Wagons 10-18 Yd. @ $1,000.00 each. One 3" No. 11 Triplex C.H.&E. Pump in excellent condition @ $1,000.00. Frowine Construction Corporation, 821 Prospect Street, Portsmouth, Ohio.

One M-51 4½ yd. Bucyrus-Erie 4-Wheel Scraper, complete with 6—9:00x20 ten ply tires in good condition, and MV-15 Bucyrus-Erie single drum Winch and adaptor for use with TD-40 International TracTracTor.

One P-14 Winch for above Scraper for use with a TD-14 International TracTracTor. Box 2903

FOR SALE—Used Bucyrus-Erie Model H-44 Scraper. Bargain Price. Condition excellent. Tires good. Inquire Box 2902.

MISCELLANEOUS EQUIPT.

FOR SALE—Special Electric Tower Excavator equipped with grizzly and crusher for shaft and underground belt disposal. Head Tower on flanged wheels and rails, and arranged for full rotation. Tail tower on caterpillars for operation at 700' radius at any point within a circle. Electrical equipment 3 phase, 60 cycle, 2300 volts Ward-Leonard with 200 hp Introduction motor. Box 2878

FOR SALE: 2 trailers pneumatic tires for hauling tractors, highlifts, bulldozers, etc. 1 tilting platform.
Riemer Brothers, 2900 Armitage Avenue, Chicago, Illinois.

---

3 **EUCLID** 6-yard and one Euclid 8-yard crawler mounted bottom dump wagons. Good condition. Industrial Salvage Mat'l Co., Milwaukee. Tel. Sheridan 0414.

If You Do Not Find What You Want Listed—Write Us

EXCAVATING engineer
South Milwaukee, Wisconsin

For Sale
Surplus Equipment

1—60 ft. dragline boom built for use with 43-B diesel Bucyrus shovel. Practically new.

1—Dragline bucket for use with above. Depth 34 in. Width 52 in. from cutting lip to back of rounded plate 60 inc. Good condition. Box 2896

For Sale in Northern Michigan

1—No. 8 McCully Gyratory Crusher, size 18" x 66" smallest size product 2¾", capacity 110 net tons per hour; largest size produce 5½", capacity 250 net tons per hour, weight 110,000 lbs.

2—No. 6 McCully Gyratory Crushers, size 12" x 44" smallest size product 2", capacity 50 net tons per hour; largest size product 4½" capacity 120 net tons per hour, weight 48,000 lbs. Box 2895

Engine

For Sale at Bargain Price

1 **Used "Waukesha-Hesselman," Oil engine, Serial No. 371416 Model XBKH, 4-cylinder, 8¾"x4¾", 20 H.P. at 900 RPM (run only 100 hours for test machine), at South Milwaukee, Wis.**

Write — Wire — Telephone

BUCYRUS-ERIE COMPANY
PARTS DEPARTMENT
SOUTH MILWAUKEE, WIS.

FOR SALE: 1 Koehring 27E Paver with all latest improvements. Model 2A. Factory serial No. 16292—in perfect working condition. Price $5,000.00 F.O.B. Frowine Construction Corporation, 821 Prospect Street, Portsmouth, Ohio.

FOR SALE: 2 yard dipper with new front, new bail lugs, new side plates, and is in A1 condition. This is a heavy rock dipper complete with bail but without bail pins or tooth bases. Box 2891

ROAD EQUIPMENT FOR RENT OR SALE

1. One three wheel, four cylinder Austin-Pup road roller, 5 ton.
2. One Adams No. 22, serial 160, leaning wheel pullgrader, 10' blade.
3. One Caterpillar Pullgrader No. 66, model 106, leaning wheels, 12' blade.
4. Two thousand lineal feet 2" black water pipe with couplings, 20' lengths.
5. One Freuhauf Trailer, 30 ton capacity, solid tires, 10' wide front and rear wheels.
6. One Jaeger Finishing Machine adjustable from three to six feet. Single screed, used generally for concrete widening and sidewalk work.

Waller Paving Co., Inc.
Telephone 1166 P. O. Box 46
Salisbury, Maryland

RUTH DREDGER H-L minus 60 h.p. Waukesha gasoline engine power plant. Purchased new 1929 and used about one year. Machine equipped with 50-foot extension and 17-bucket elevator. Main crawler 16'0" long. Track links 8" pitch, 40" long. Overall length of dredger 30'0". This type dredger is particularly adapted for cleaning, digging, enlarging drainage canals of not more than 40 feet in width. For sale by receiver. Any reasonable offer will be accepted. Location Florida east coast. Box 2901

LOCOMOTIVE

40-TON VULCAN Saddle Tank Locomotive. Standard gauge. A.S.M.E. boiler good for 190 lbs. Rebuilt and ready to go.

MACKINTOSH ENGINEERING CO.
2907 Library Avenue, Cleveland, Ohio.

BARGAINS

Shovel attachment, chain crowd, boom, dipper sticks, bucket for 1½ yd. Osgood No. 2868. Gasoline. 85% new.
Shovel attachment-boom, sticks, and dipper for 1½ yd. steam Osgood.
One 1½ yd. dragline bucket.
One 2-yd. dragline bucket. Box 2899

AMERICAN DITCHER—7x8 machine for operation on flat car or standard gauge track. Equipped 43x91" submerged flue type boiler, hoisting drum 14x22¾", pull-in drum 14x22¾", boom drum 10¼x11" long. Machine in good condition, available immediately. Rib Lake Lumber Co., Rib Lake, Wis.

Bucyrus-Erie 1¼-yd. GA-2 gas + air shovel. A-1.
Allis-Chalmers 18" Gates No. 8K gyratory crusher, manganese fitted, No. 5405, Tex-rope; A-1.
Plymouth 10 ton gas locomotive, 24" ga., No. 3531.
Milwaukee 8 ton gas locomotive, 36" ga., No. 768.
4—Davenport, Porter, and Vulcan steam locomotives, 36" ga., saddletanks.
Above dinkeys good shape, link and pin couplers.
Bucyrus 80-B high lift steam shovel, on cats.
Monighan 3-T Walker dragline elce., 70' bm.
H. Y. Smith Co., 828 N. Broadway, Milwaukee

2 **MODEL L A-C TRACTORS** silent geared nigger-head winches; 27-E Rex Paver; Issacson & Gar Wood Bulldozers; Cletrac 55 with Issacson Hydraulic bulldozer; 5 complete hydraulic dumps 2 and 2½ yards; 5 Hercules JXC Gas Motors; 2 Red Seal Continental motors; 1 Keystone ½ yard backhoe, can be used for stationary derrick, price $750; five forward speed transmissions—BrownLipe, Clark. Sols, 95 Flat Shoals Avenue, S.E., Atlanta, Ga.

Need a Dragline Bucket?

Here are three new and three used Dragline buckets—offered at bargain prices.

ONE ⅝-AX Beco Rebuilt, 1,600 lbs.
TWO 2 yd. Beco AU, 3,300 lbs. New.
ONE 3½ yd. Beco AU-AX 6,400 lbs. Used.
ONE 4 yd. Beco Y, 11,500 lbs. Used.
ONE 7 yd. Monighan W, 13,700 lbs. New.

Money savers for you. New and rebuilt equipment carries new machine guarantee.

Write — Wire — Telephone

BUCYRUS-ERIE COMPANY
PARTS DEPARTMENT
SOUTH MILWAUKEE, WIS.

WANTED: ⅝ to ¾ yard shovel. Also good used Caterpillar D4 or R4 with Athey Mobiloader attached. Give full description and price.

Z. E. Reese, Regent, North Dakota

WILL TRADE

Have Bucyrus-Erie Model S-108 equipped with 6—1200x20—14 ply tires in excellent condition. Will trade for Bucyrus-Erie model S-90 Scraper equipped with either 6—1100x20 or 6—1300x20 tires. Reply giving serial number, location and advise condition of tire equipment.

Box 2894

WANTED

LORAIN 40 diesel shovel. Clifford Waterhouse, Jackson, Miss. Tel. 2-0617.

Wanted

Massachusetts contractor wants 1 or 1¼ yard gas power shovel in good condition. Give full particulars including price in first letter. Box 2900

WANTED—Excavators, from 1 cu. yd. up. Repairable or in good condition. Single or combination, diesel or gasoline units preferred. Cash on delivery. Box 2904